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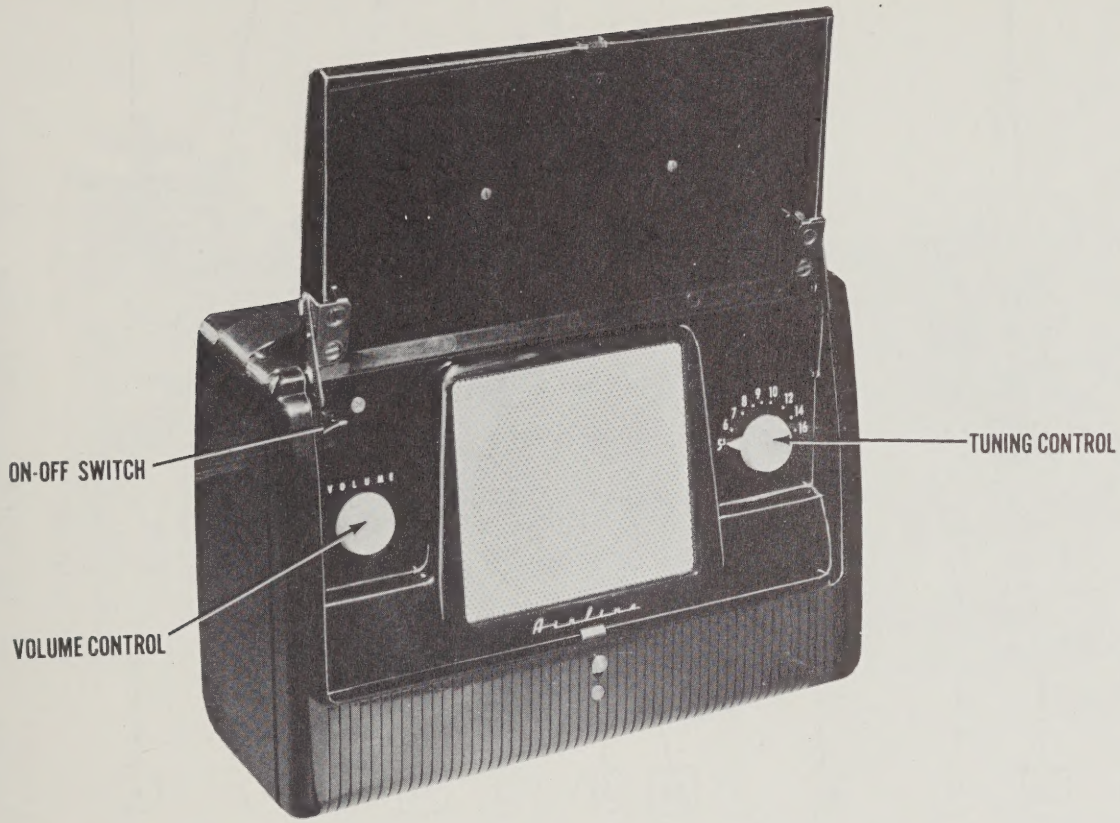
AIRLINE MODEL 84WG-1060A
BATTERY-LINE OPERATED



AIRLINE MODEL 84WG-1060A
BATTERY-LINE OPERATED

AIRLINE MODEL 84WG-1060A

TRADE NAME	Airline, 84WG-1060A
SUPPLIER	Montgomery ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output
POWER SUPPLY	105-125 Volts AC-DC or 6 Volt "A" Supply and 67.5 Volt "B" Supply
RATING	.11 Amp. @ 117 Volts AC or 6 Volt "A" Supply and 67.5 Volt "B" Supply
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

For IF Alignment remove receiver from cabinet and shunt 500KΩ across loop terminals. Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to Pin 6 (grid) of 1R5. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF. to reduce hum modulation. Remove 500KC resistor from loop terminals and replace receiver in cabinet.
2		Loop	1610KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"		Set pointer to 1500KC dial calibration mark.
4		"	1400KC	"	"	A6	Adjust for maximum output.

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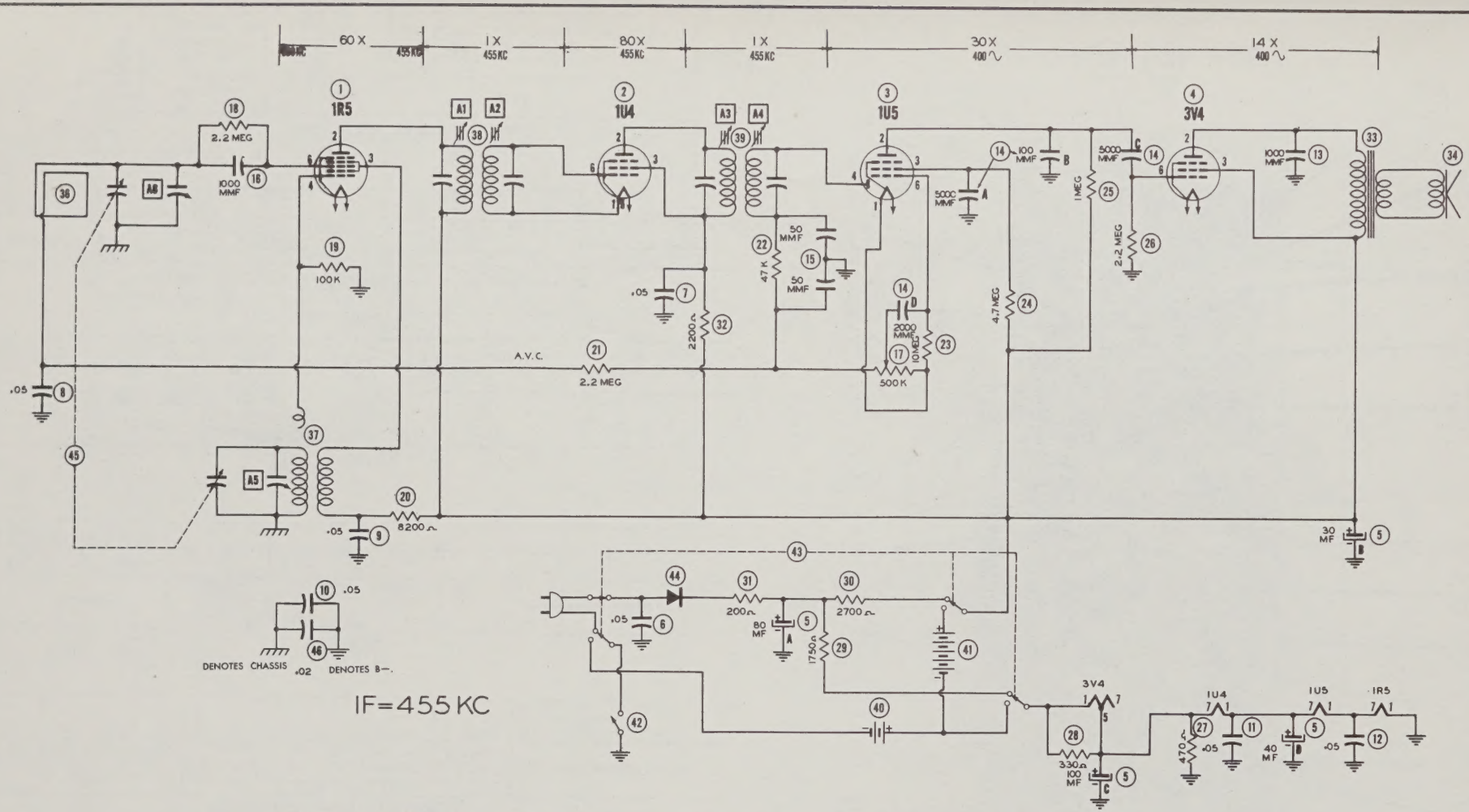

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	75VDC	55VDC	-19VDC§	0V.	.1VDC	1.4VDC
2	1U4	2.7VDC	75VDC	75VDC	0V.	2.7VDC	2.7VDC	4VDC
3	1U5	1.4VDC	18VDC	12VDC	.3VDC	0V.	.1VDC	2.7VDC
4	3V4	5.2VDC	73VDC	75VDC	0V.	4VDC	0V.	4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	4.5KΩ	13KΩ	100KΩ	0Ω	4.9 Meg.	*
2	1U4	*	4.5KΩ	4.5KΩ	INF.	*	*	*
3	1U5	*	1 Meg.	4.7 Meg.	550KΩ	INF.	10 Meg.	*
4	3V4	*	4.5KΩ	4.5KΩ	0Ω	*	2.2 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-1

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin 1 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

ARVIN MODEL 240-P (Ch. RE-243)
BATTERY OPERATED

ARVIN MODEL 240-P (Ch. RE-243)
BATTERY OPERATED

ARVIN MODEL 240-P

TRADE NAME	Arvin, Model 240-P (Ch. RE-243)
MANUFACTURER	Noblitt Sparks Industries, Columbus, Indiana
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 1LB4 Power Output
POWER SUPPLY	1.5 Volt "A" Supply and 67.5 Volt "B" Supply
RATING	200MA @ 1.5 Volts DC and 7.9 MA @ 67.5 Volts DC
TUNING RANGE--BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are four calibration holes on dial backplate. In order from top to bottom these are: low frequency, end limit, 600KC, 1400KC and high frequency end limit. To set pointer turn tuning cap. fully closed and set top edge of pointer across center of low freq. end limit hole.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2		Loop	1400KC	Top edge of dial pointer across center of 1400KC calibration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.
4		"	600KC	"	"		If sensitivity is low, bend rear rotor plates to maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.

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DATE 7/48-#4812-2 SET #42-FOLDER #2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	1LB4	1LB4	5AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	10	150	A21811	PR8150/12	BR1215	M-10-150	UT-121	Filter
6	.001	600	C20069-102	684-001	DT6D1		TC-21	Output Plate Bypass *
7	.005	600	C20069-502	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
8	.01	400	C20068-503	484-01	DT4S1	ST-4-01	TC-11	AF Screen Bypass
9	.002	600	C20069-202	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
10	.05	200	C20067-503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
11	50	500	C20065-500	1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass †
12	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RK Filter
13	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

†Later productions use 100MMF. in this application.
*Later productions use .002 MF in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	
14	1 Meg.	½	C21782			Volume Control & Sw.

RESISTORS

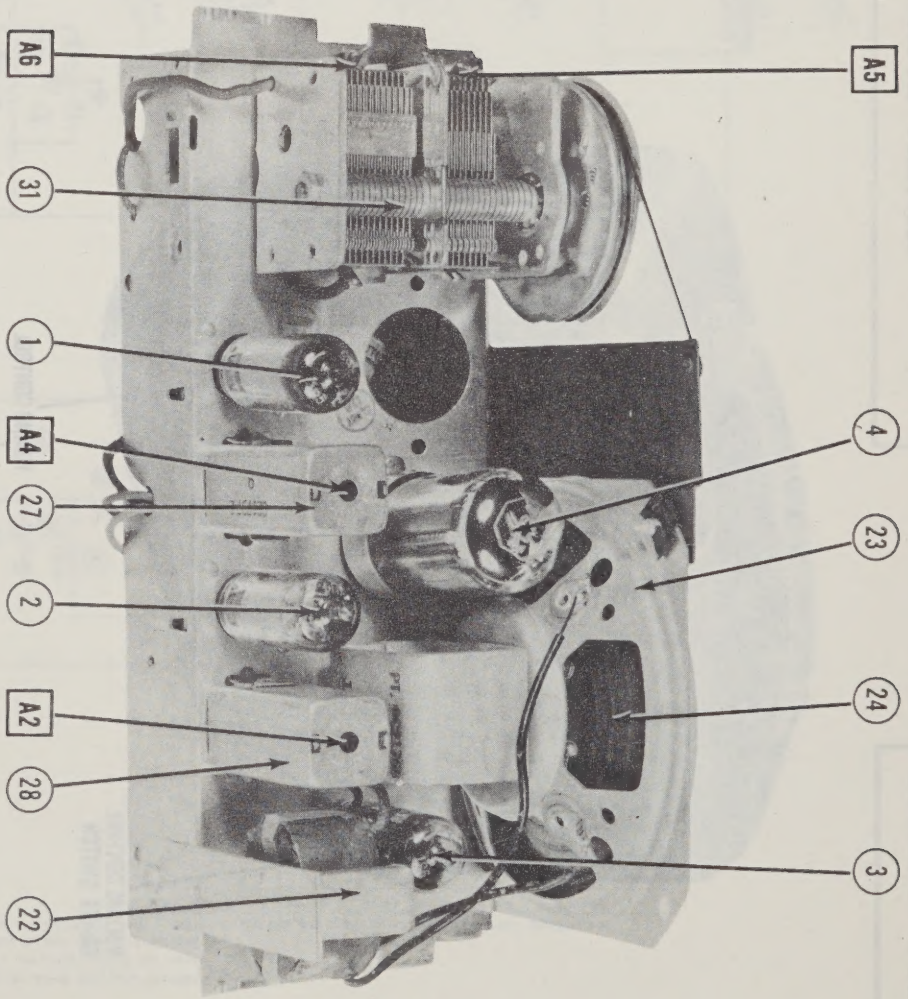
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	
15	100KΩ	½	C20060-104	BTS-100K	Br.-Blk.-Yl. Osc. Grid
16	2.2 Meg.	½	C20060-225	BTS-2.2 Meg.	Red-Red-Br. AVC Network
17	10 Meg.	½	C20060-106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
18	1 Meg.	½	C20060-105	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
19	4.7 Meg.	½	C20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
20	2.2 Meg.	½	C20060-225	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
21	750Ω	½	C20245-751	BTS-680	Yl.-Grn.-Br. Bias
32	10 Meg.	½	C20060-106	BTS-10 Meg.	Br.-Blk.-Blue Feedback-See Note 1

Note 1-Used in later productions.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
22	12KΩ	3.3Ω	280Ω	.3Ω	AC21799-1		T22S48#	A-2999#	#Drill one new mounting holes.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA ARVIN PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.		ST-113#		#Drill one new mounting hole.
23	PM	3.3Ω	C21768	Mod. P4-X	4A15#	
	CONE DIA.	VC DIA.				
24	4"	1/2"				

R F COILS

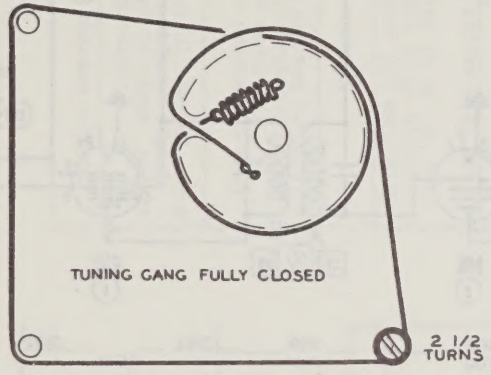
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ARVIN PART No.	MEISSNER PART No.
25	Loop Ant.		1.3Ω	AD21795-1	
26	Osc. Coil	1.7Ω	7.2Ω	AC21796-1	14-1060
27	Input IF	25.3Ω	25.3Ω	C21797-1	16-6668
28	Output IF	25.3Ω	24.2Ω	C21797-2	16-6669

BATTERIES

ITEM No.	VOLTAGE	ARVIN PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
29	1.5V "A"		#950			2R			3 Used in Parallel
30	67.5V"B"			#467			XX45		

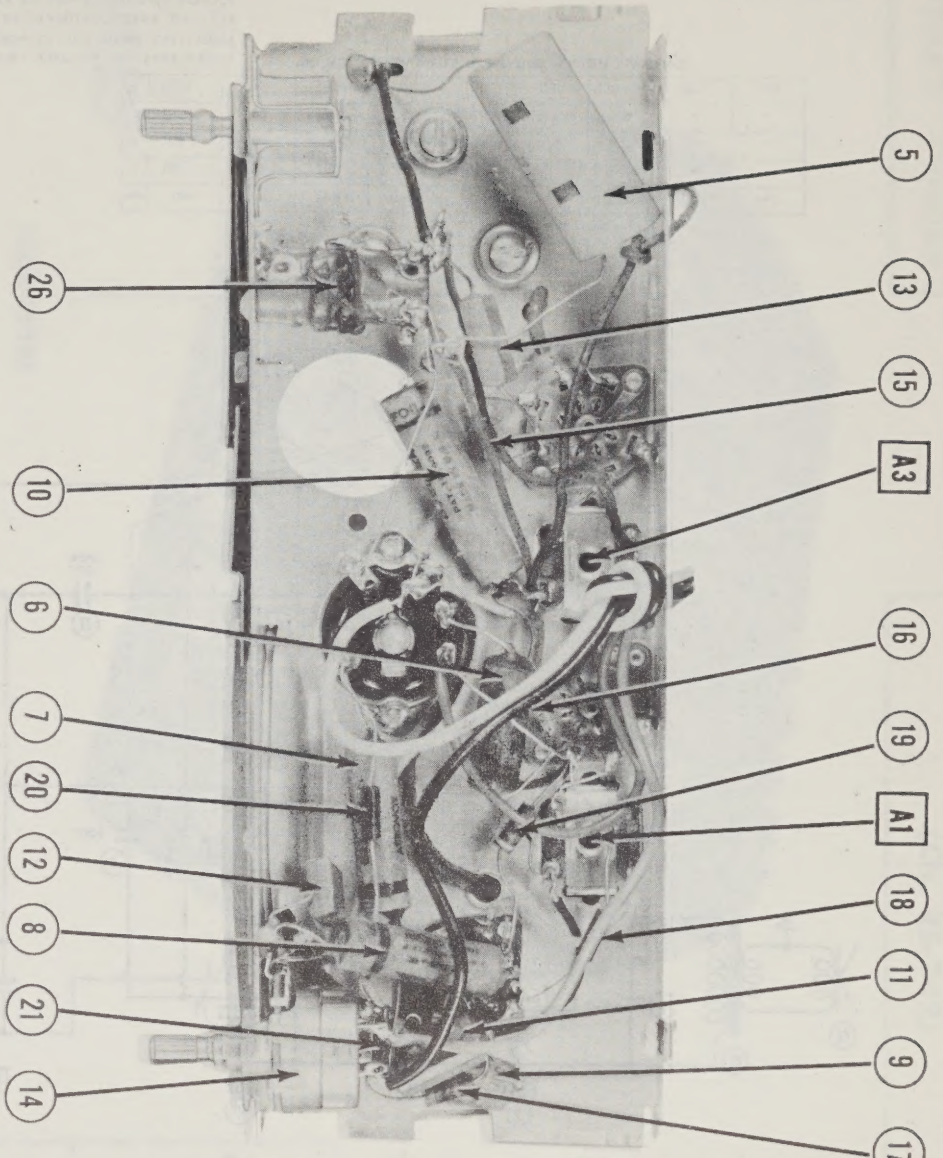
MISCELLANEOUS

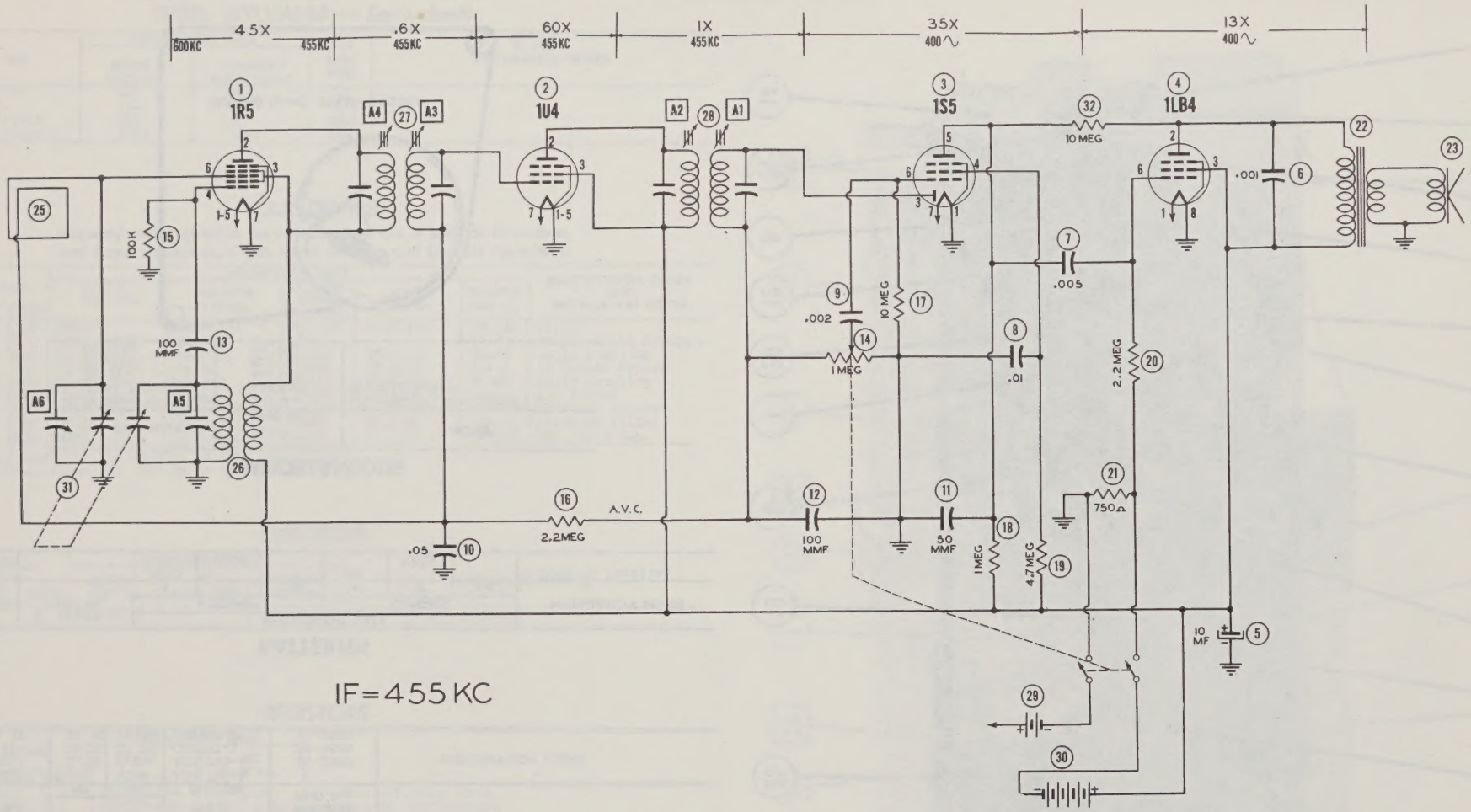
ITEM No.	PART NAME	ARVIN PART No.	NOTES
31	2 Gang Var. Cap	C19822	(31-496MMF, 27-191MMF)
	Dial Pointer	A21783-1	Specify Color
	Knob	A21764-1	" "
	Cabinet	E21761-1	" "
	Handle	C21766	" "



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1R5	0V.	60VDC	60VDC	-22VDC§	0V.	-.1VDC	1.4VDC	-
2	1U4	0V.	60VDC	60VDC	0V.	0V.	-.1VDC	1.4VDC	-
3	1S5	0V.	0V.	-.2VDC	10VDC	9VDC	-.1VDC	1.4VDC	-
4	1LB4	1.4VDC	60VDC	60VDC	0V.	0V.	0V.	0V.	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1R5	0Ω	150KΩ	150KΩ	100KΩ	0Ω	3.2 Meg.	*	-
2	1U4	0Ω	150KΩ	150KΩ	INF.	0Ω	3.2 Meg.	*	-
3	1S5	0Ω	INF.	1 Meg.	4.7 Meg.	1.2 Meg.	10 Meg.	*	-
4	1LB4	*	150KΩ	150KΩ	INF.	INF.	2.2 Meg.	INF.	0Ω

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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4812-2

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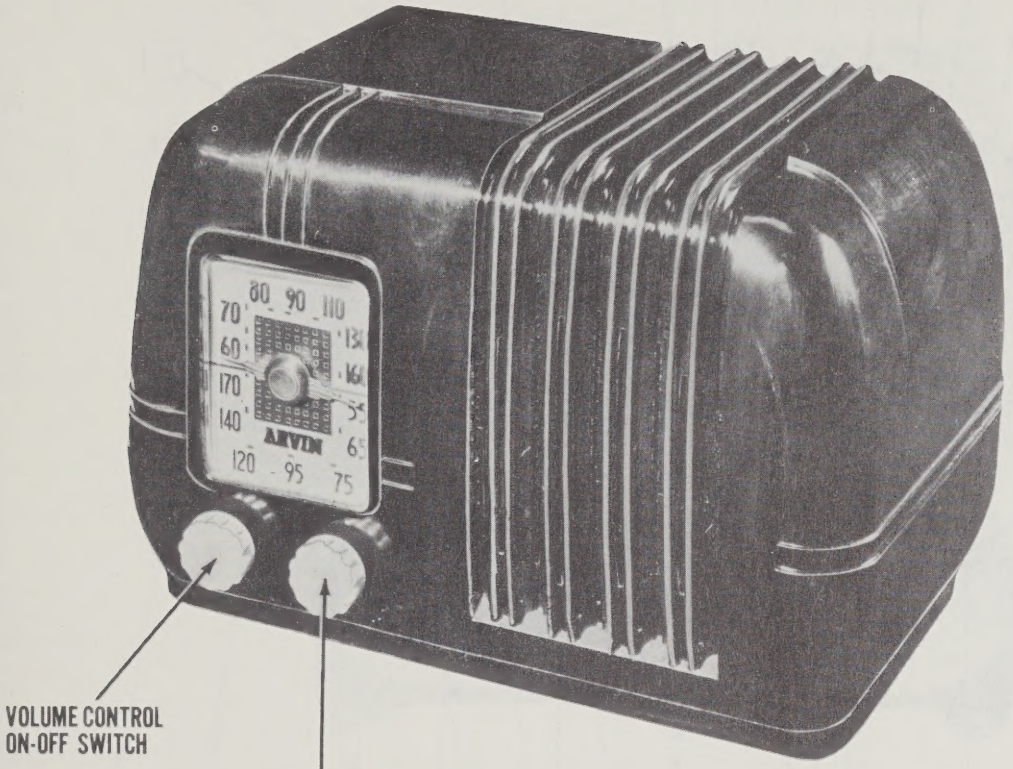
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

ARVIN MODEL 547A
(Ch. RE-242)



ARVIN MODEL 547A
(Ch. RE-242)

ARVIN MODEL 547

TRADE NAME	Arvin, Models 547, 547A (Ch. RE-242)
MANUFACTURER	Noblitt-Spraks Industries, Columbus, Ind.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 7/48-#4812-3 SET #42-FOLDER #3

PARTS LIST AND DESCRIPTIONS

ARVIN MODELS
547, 547A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	50	150		PRS-A40302	EDL5315C	DSB-303	TA-530	Filter-Red
B	30	150					"	-Blue
C	20	25					TA-25	Cathode Bypass-Grn.
6A	40	150	A19136	PRS-A40302	EDL4215C	DSB-303	TA-240	Alternate Filter
B	20	150					"	"
C	20	25					TA-25	Cathode Bypass
7	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.1	400	C20068-104	484-.1	DT4P1	ST-4-1	TC-1	RF Bypass Pwr. Supply
9	.03	400	C20068-303	484-03	DT4S3	ST-4-03	TC-13	Output Plate Bypass
10	.05	200	C20067-503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
11	.05	400	C20068-503	484-05	DT4S5	ST-4-05	72P1	Line Isolation
12A	2000	300	*	1467-002	1W5D2	MW.5-002	1FM-22	Audio Coupling
B	500	300		1468-005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
13	1000	300	†	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
14	500	300	C20226-501	1468-0005	5W5T5	MO.5-35	1FM-35	Diode RF Filter
15	50	300	A21643	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.

*Items 12A & 12B are part of resistor capacitor combination and may be obtained under Part #A21659.
†Item 13 is part of resistor cap. combination and may be obtained under Part #A21660.

CONTROLS

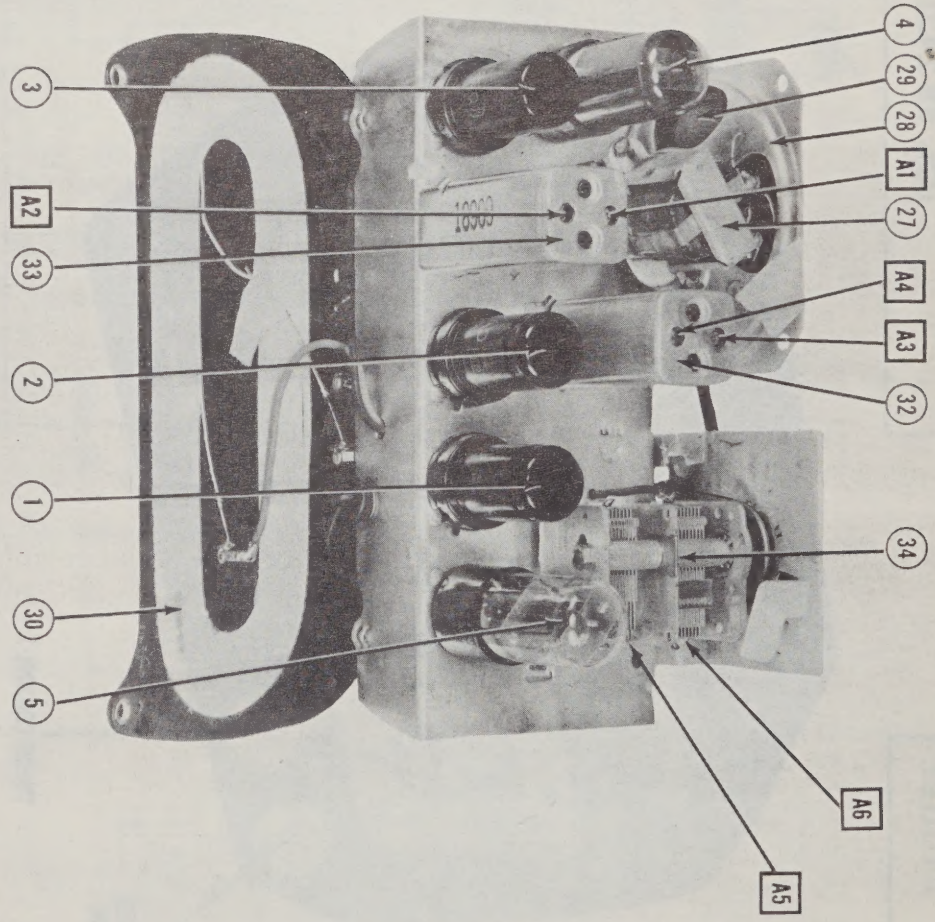
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	
16A	1 Meg.	½	B17291	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	
17	22KΩ	¼	C20060-223	BTS-22K	Red-Red-Or. Oscillator Grid
18	15 Meg.	¼	C20060-156	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
19	2.2 Meg.	¼	C20060-225	BTS-2.2 Meg.	Red-Red-Grn. " "
20	4.7 Meg.		†	BTS-4.7 Meg.	AF Grid
21	470KΩ	¼	C20060-474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
22	470KΩ		*	BTS-470K	Output Grid
23	150Ω	¼	C20060-151	BW-½-150	Br.-Grn.-Br. Output Cathode
24	1500Ω	1	C20070-152	BTA-1500	Br.-Grn.-Red Filter
25	15Ω	¼	C20060-150	BW-½-15	Br.-Grn.-Blk. Surge Limiter
26	330KΩ	¼	C20060-334	BTS-330K	Or.-Or.-Yl. Line Isolation

†Items 20 & 13 may be obtained as one unit under Part #A21660.
*Items 22, 12A and 12B may be obtained as unit under Part #A21659.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
27	2000Ω	3.5Ω	165Ω	.4Ω	AC-18647-1				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113		
28	PM	3.5Ω	AC-21657	Mod. P4-X	4A07	
	CONE DIA.	VC DIA.				
29	4"	1/2"				

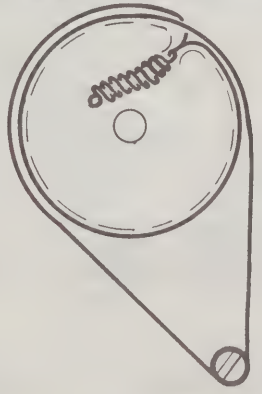
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	
30	Loop Ant.		1.6Ω	AC21647-1		
31	Osc. Coil	.5Ω	6Ω	AC18646-1	14-1060	
32	Input IF	16Ω	16Ω	AC18908-1	16-6658	
33	Output IF	15Ω	15Ω	AC18909-1	16-6660	

MISCELLANEOUS

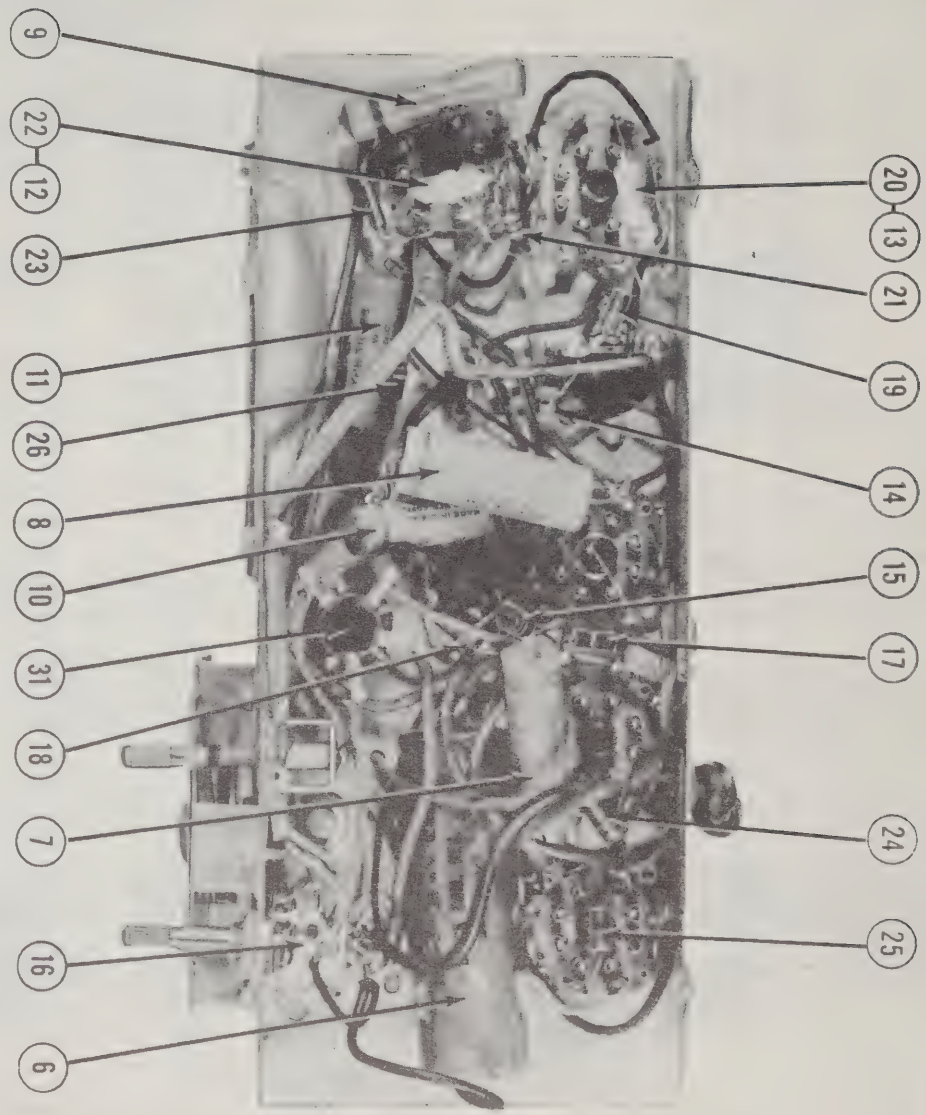
ITEM No.	PART NAME	ARVIN PART No.	NOTES
34	2 Gang Var. Cap.	B18869	(15-370MMF, 15-180MMF)

TUNING GANG FULLY CLOSED



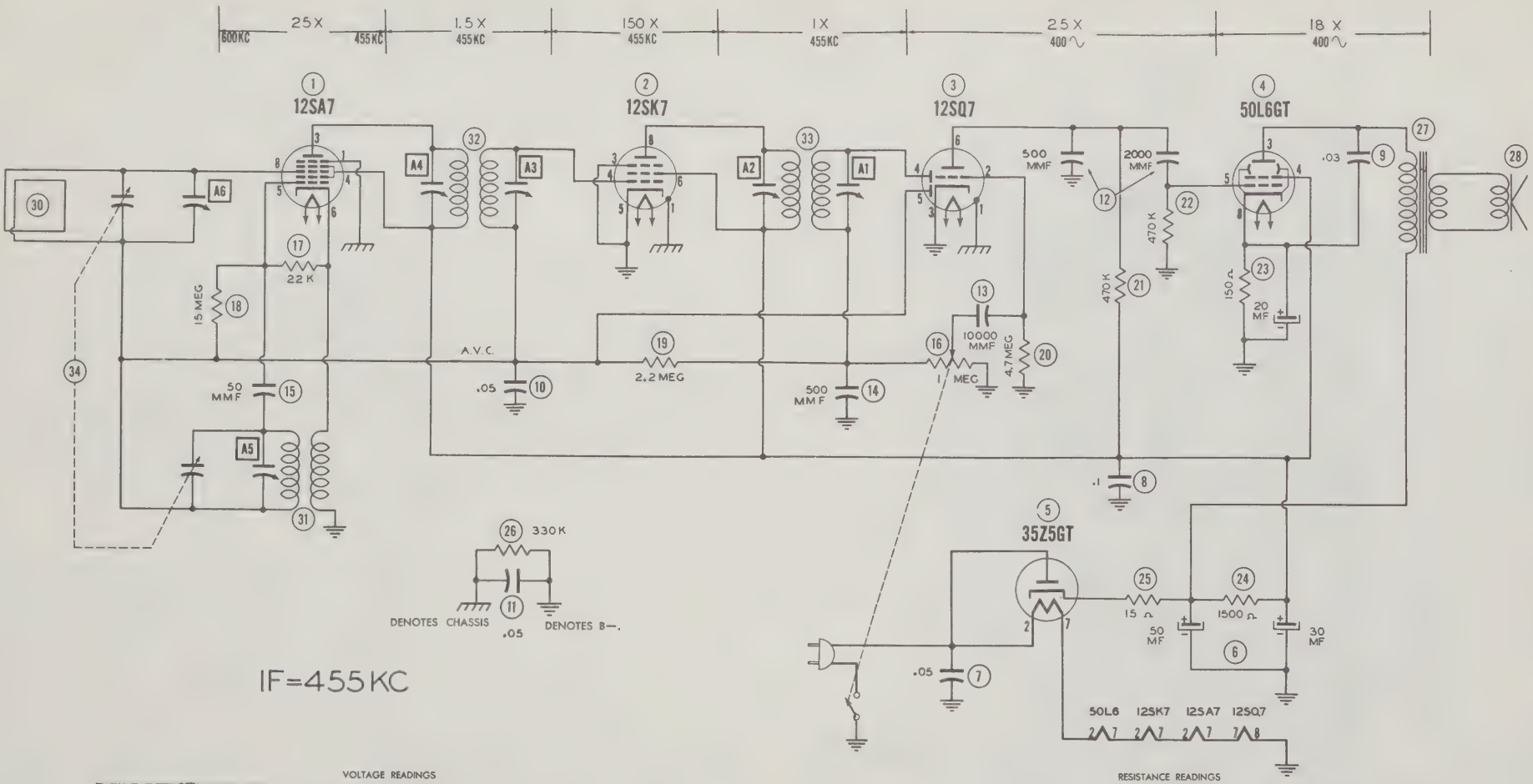
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



ARVIN MODELS 547, 547A

ARVIN MODELS 547, 547A



IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	24VAC	95VDC	95VDC	-14VDC§	0V.	12VAC	-.5VDC
2	12SK7	0V.	36VAC	0V.	-.5VDC	0V.	95VDC	24VAC	95VDC
3	12SQ7	0V.	-.5VDC	0V.	-.4VDC	-.5VDC	57VDC	12VAC	0V.
4	50L6GT	0V.	95VAC	126VDC	95VDC	0V.	0V.	36VAC	6VDC
5	35Z5GT	0V.	117VAC	111VAC	132VDC	117VAC	0V.	85VAC	132VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	330KΩ	24Ω	170KΩ	170KΩ	22KΩ	.5Ω	12Ω	3.2 Meg.
2	12SK7	330KΩ	36Ω	0Ω	3.2 Meg.	0Ω	170KΩ	24Ω	170KΩ
3	12SQ7	330KΩ	4.7 Meg.	0Ω	1 Meg.	3.2 Meg.	640KΩ	12Ω	0Ω
4	50L6GT	INF.	90Ω	170KΩ	170KΩ	470KΩ	0Ω	36Ω	150Ω
5	35Z5GT	INF.	120Ω	115Ω	170KΩ	120Ω	INF.	90Ω	170KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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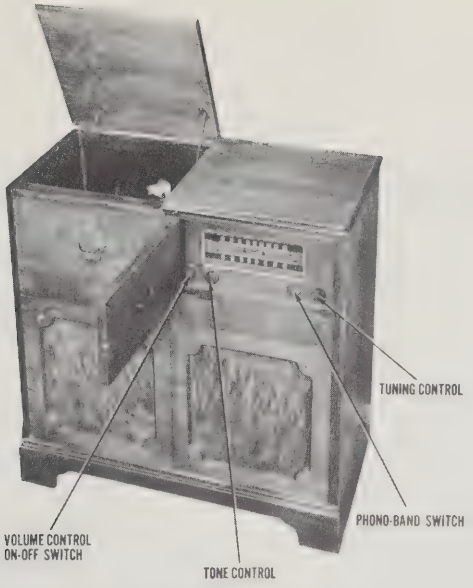
4812-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



BENDIX MODEL 1521

TRADE NAME	Bendix, Model 1521
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Maryland
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver with Loop Ant.
TUBES (EIGHT)	Types, 6AG5 FM RF Amp., 7F8 Converter, 7AH7 1st IF Amp., 7AG7 2nd IF Amp., 6H6 FM Disc., 6SQ7 AM Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATING .51 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC — FM 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to vertical calibration mark at left end of lower edge of dial backplate. The horizontal calibration lines on lower edge of dial backplate are in two rows. The upper row for FM at 90MC, 97MC and 106MC. The lower row for AM at 580KC, 965KC and 1475KC. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4, A5,A6	Adjust for maximum output.
2	Connect 3.7 μh. choke from black wire to white wire on loop ant. socket.	High side thru .01 MFD cap. to white wire of ant. loop socket. Low side to chassis.	580KC	"	580KC calibration mark.	"	A7	" " " "
3	"	"	1475KC	"	1475KC calibration mark	"	A8,A9	" " " "
4	"	"	580KC	"	Tune for maximum output.	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3 & 4 until no further improvement can be made.
5	"	"	965KC	"	"	"		Check calibration.
6	"	"	580KC	"	"	"		Check calibration. If not correct within 10KC tuning cap. rotor plates must be bent. If correction is necessary repeat Steps 2, 3 & 4.

FOR FM ALIGNMENT SEE REAR PAGE OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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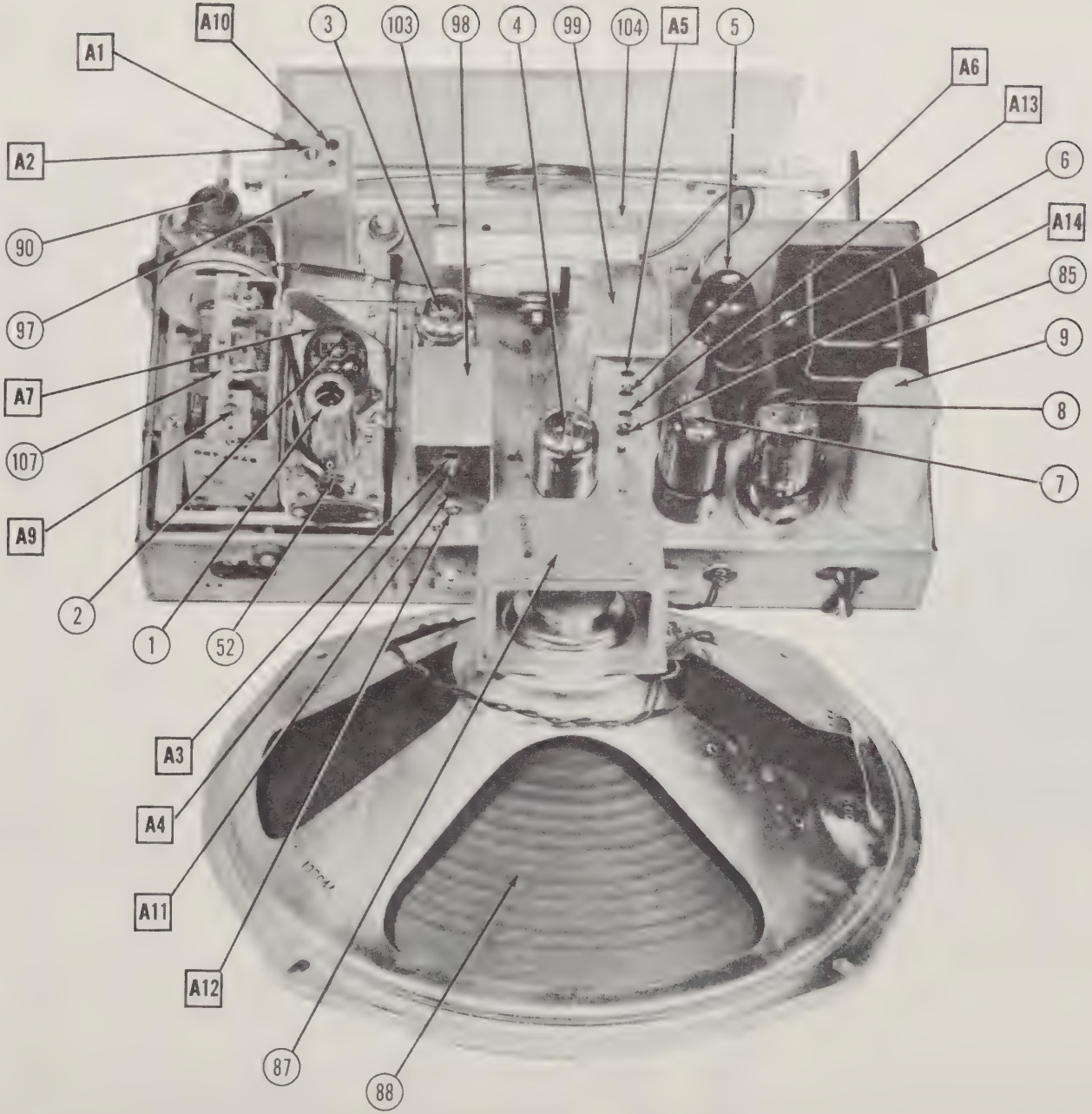
DATE 7/48-#4812-4 SET #42-FOLDER #4


A10
3
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A6
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A14
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97
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A7
8
107
7
A9
2
1
52
A3
A4
A11
A12
87
88

BENDIX MODEL
1521

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6AG5	6AG5	7BD	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	7AH7	7AH7		
4	2nd IF Amp.	7AG7	7AG7		
5	FM Disc.	6H6	6H6	7Q	
6	AM Det.-AVC-AF	6SQ7	6SQ7	8Q	
7	Power Output	6V6GT	6V6GT	7AC	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	450	CE3A03	AF4444J*	UP222245*	DY-4x20-450*	EL-420*	◓ Filter
B	40	450						▲ "
C	20	450						■ "
10	25	25	CE1T00	PRS25/25	BR252A	M-25-25	TA-25	Cathode Bypass
11	25	25	CE1T00	PRS25/25	BR252A	M-25-25	TA-25	Ratio Det. Bias
12	3	50	CE1T01	PRS450/4	BR550	M-4-450	TA-55	" " "
13	.005	600	CP6T18	684-005	DT6D5	MPH-6-005	TC-25	Line Filter
14	.005	600	CP6T18	684-005	DT6D5	MPH-6-005	TC-25	" "
15	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
16	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	AF Plate Decoupling
17	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	Audio Coupling
18	.01	400	CP4T31	484-01	DT4S1	ST-4-01	TC-11	Tone Comp.
19	.002	600	CP6T12	684-002	DT6D2	ST-6-002	TC-22	" "
20	.03	200	CP2T36	484-03	DT4S3	ST-4-03	TC-13	Audio Coupling
21	.006	600	CP6T20	684-006	DT6D6	ST-6-006	TC-26	" "
22	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
23	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	2nd IF Cathode Bypass
24	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	2nd IF Decoupling
25	.01	600	CP6T31	684-01	DT6S1	ST-6-01	TC-11	Filament Bypass
26	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	1st IF Decoupling
27	.01	600	CP6T31	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
28	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	Decoupling
29	.02	200	CP4M34	484-02	DT2S2	ST-4-02	TC-12	AVC Filter
30	220	500	CM5A30	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
31	220	500	CM5A30	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
32	1000	200	CP2M10	1468-001	1W5D1	MO.3-21	1FM-21	RF Bypass
33	1000	200	CP2M10	1479-001	1R5D1	MWS.5-21	MS-21	Diode Load Cap.
34	1000	200	CP2M10	1479-001	1R5D1	MWS.5-21	MS-21	Diode Load Cap.
35	1000	200	CM2M10	1468-001	1W5D1	MO.3-21	1FM-21	Test Jack Bypass
36	680	300	CM4A42		1W5T7	MO.3-37	1FM-37	De-emphasis
37	680	300	CM4A42		1W5T7	MO.3-37	1FM-37	"
38	100	500	CM5A22	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
39	220	500	CM5A30	1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Coupling
40	15	500	CM5L03				MS-415	Fixed Padder
41	680	300	CM4A42		1W5T7	MO.5-37	1FM-37	Conv. Cathode Bypass
42	45	500	CC8A30	1468-00004	5W5Q4	MO.5-44	1FM-44	Conv. Plate Bypass-Cer.
43	4.7		CC0F18	1468-000005	5W5V5	MO.5-55	MS-55	" " " " "
44	220	500	CM5A30	1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling
45	15	500	CC8A24				MS-415	" " -Cer.
46	680	300	CM4A42		1W5T7	MO.3-37	1FM-37	FM RF Screen Bypass
47	45	500	CC8A30	1468-00004	5W5Q5	MO.5-44	1FM-44	RF Coupling-Cer.
48	100	500	CM5A22	1468-0001	5W5T1	MO.5-31	1FM-31	Filament Bypass

*Parallel sections to obtain desired capacity.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
87	FIELD	VC IMP.	SP1R01	ST-102‡	12A4‡	‡Replace output transformer to match 6-8Ω voice coil.
	PM	3.9Ω		Mod. P-12-8		
	CONE DIA.	VC DIA.				
88	11-3/8"	1"				

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: MEISSNER PART No.	
89	Loop Ant.BC		.2Ω	BZ0B10		
90	Ant. Coil BC		1.8Ω	TR8B02		
91	Ant. Coil FM		0Ω	TA8F00		
92	RF Plate Coil		.1Ω	LF0A01		
93	FM RF Coil		0Ω	TR8P00		
94	Osc. Plate Coil		.1Ω	LF0A01		
95	Osc. Coil AM		6Ω	LO8B00		
96	" " FM		0Ω	LO8F00		
97A	1st IF AM		26Ω	T10C06		
B	" " FM		.1Ω			
98A	2nd IF AM	9Ω§	9Ω‡	T10100		§ Includes both pri. ‡ Includes both sec.
B	" " FM					
99A	3rd IF AM	13Ω§		T10D08		
B	FM Det.Trans		.1Ω			
100	RF Choke		0Ω	LF0C00		
101	" "		.1Ω	LF0A00		
102	" "		.1Ω	LF0A00		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
103	Bayonet	6-8	0.25	Blue	#44		Type 44
104	"	6-8	0.25	"	#44		" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
105		QT3-J	QT-J Original Part

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
106	Switch	SR3G00	Band-Phono
107	Tuning Gang	CV0D00	AM (44-547MMF, 44-547MMF)
A7	Padder	CT1A11	AM Osc. Adj.
A8	Trimmer	CT1C01	" " "
A9	"	CT1A10	AM Ant. Adj.
A15	"	CT1A09	FM Osc. Adj.
A16	"	CT1C00	FM RF Adj.
A17	"	CT1C00	FM Ant. Adj.
	Dial Pointer	ID0M13	
	Dial Scale	DS0C07	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	
49A	2 Meg.	½	RV4S10	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 49A per instructions
C	Switch		" "	41	SW-A	" " " " "
50A	4 Meg.	½	RV4C00	D11-141	M-68-Z	Tone Control-Early production
B	Shaft		Not Req.	A	Not Req.	Attach to 50A per instructions
50A	10 Meg.	½		D11-143	M-99-Z	Tone Control-Later production
B	Shaft			A	Not Req.	Attach to 50A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	
51	1 Meg.	½	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
52	330Ω	½	RC1H18		Or.-Or.-Br. Ant. Loading
53	68KΩ	½	RC2H46	BTS-68K	Blue-Gray-Or. RF Screen Dropping
54	1 Meg.	½	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid
55	1800Ω	½	RC2G27	BTS-1800	Br.-Gray-Red Conv. Cathode
56	22KΩ	½	RC1H40	BTS-22K	Red-Red-Or. Osc. Grid
57	6800Ω	½	RC2H34	BTS-6800	Blue-Gray-Red FM Osc. Plate Load
58	68KΩ	½	RC2H46	BTS-68K	Blue-Gray-Or. AM Osc. Plate Load
59	47KΩ	½	RC2H44	BTS-47K	Yl.-Vi.-Or. Conv. Plate
60	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. AVC Network
61	470Ω	½	RC1H20	BTS-470	Yl.-Vi.-Br. Decoupling
62	1000Ω	½	RC2H24	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
63	10Ω	½	RC2H00		Br.-Blk.-Blk. Parasitic Supp.
64	47Ω	½	RC2H08		Yl.-Vi.-Blk. 1st IF Cathode
65	1000Ω	½	RC2H24	BTS-1000	Br.-Blk.-Red 2nd IF Decoup.
66	220Ω	½	RC2H16		Red-Red-Br. 2nd IF Cathode
67	1 Meg.	½	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
68	2.2 Meg.	½	RC1H66	BTS-2.2 Meg.	Red-Red-Grn. " "
69	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. De-emphasis
70	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. Diode Load
71	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. Ratio Det. Bias
72	1000Ω	½	RC2H24	BTS-1000	Br.-Blk.-Red " " "
73	1000Ω	½	RC2H24	BTS-1000	Br.-Blk.-Red Series Test Jack
74	33K	½	RC1H42	BTS-33K	Or.-Or.-Or. Ratio Det. Bias
75	22KΩ	½	RC1H40	BTS-22K	Red-Red-Or. " " "
76	470KΩ	½	RC1H58	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
77	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. Tone Comp.
78	10 Meg.	½	RC1H74	BTS-10 Meg.	Br.-Blk.-Blue Audio Grid
79	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. Audio Plate Load
80	100KΩ	½	RC1H51	BTS-100K	Br.-Blk.-Yl. Audio Plate Decoup.
81	470KΩ	½	RC1H58	BTS-470K	Yl.-Vi.-Yl. Output Grid
82	270Ω	1	RW1B34	BW-1-270	Red-Vi.-Br. Output Cathode
83	1500Ω	2	RC4D26	BT-2-1500	Br.-Grn.-Red Filter
84	220Ω	2	RW2A16	BW-2-220	Red-Red-Br. "

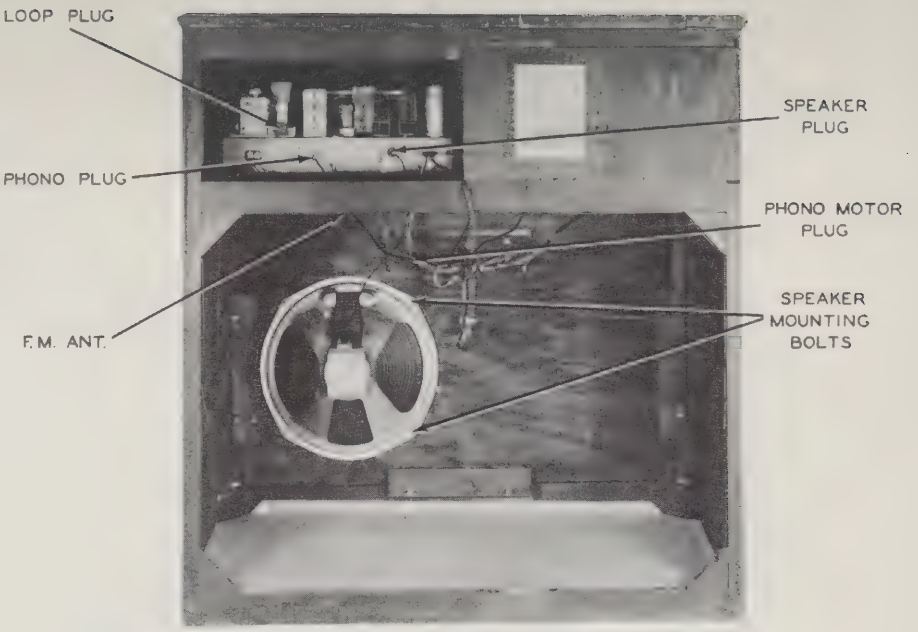
TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BENDIX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
85	117V AC @ .51A	520V CT .068A DC	5.0V AC @ 2.0A	6.3V AC @ 2.1A	TP0-J00	P-6011†	T22R02†	P-2951†

†Drill new mounting holes and add series resistor to reduce plate voltage.

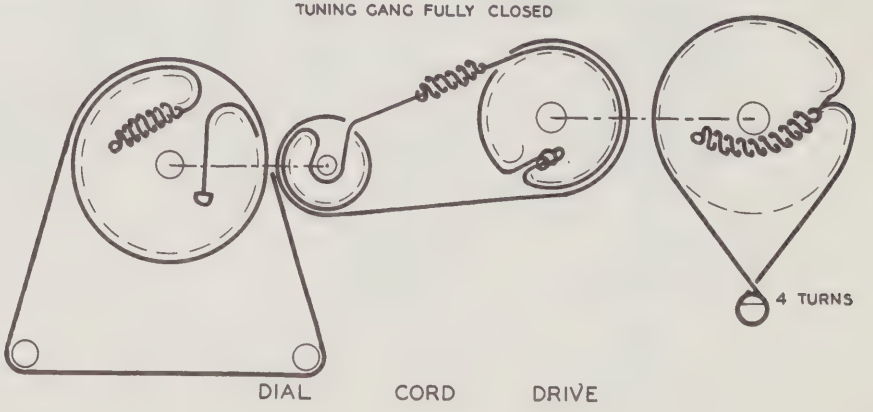
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BENDIX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
86	5300Ω	3.9Ω	520Ω	.6Ω	TA0009	A-3277	T22546	A-2930	

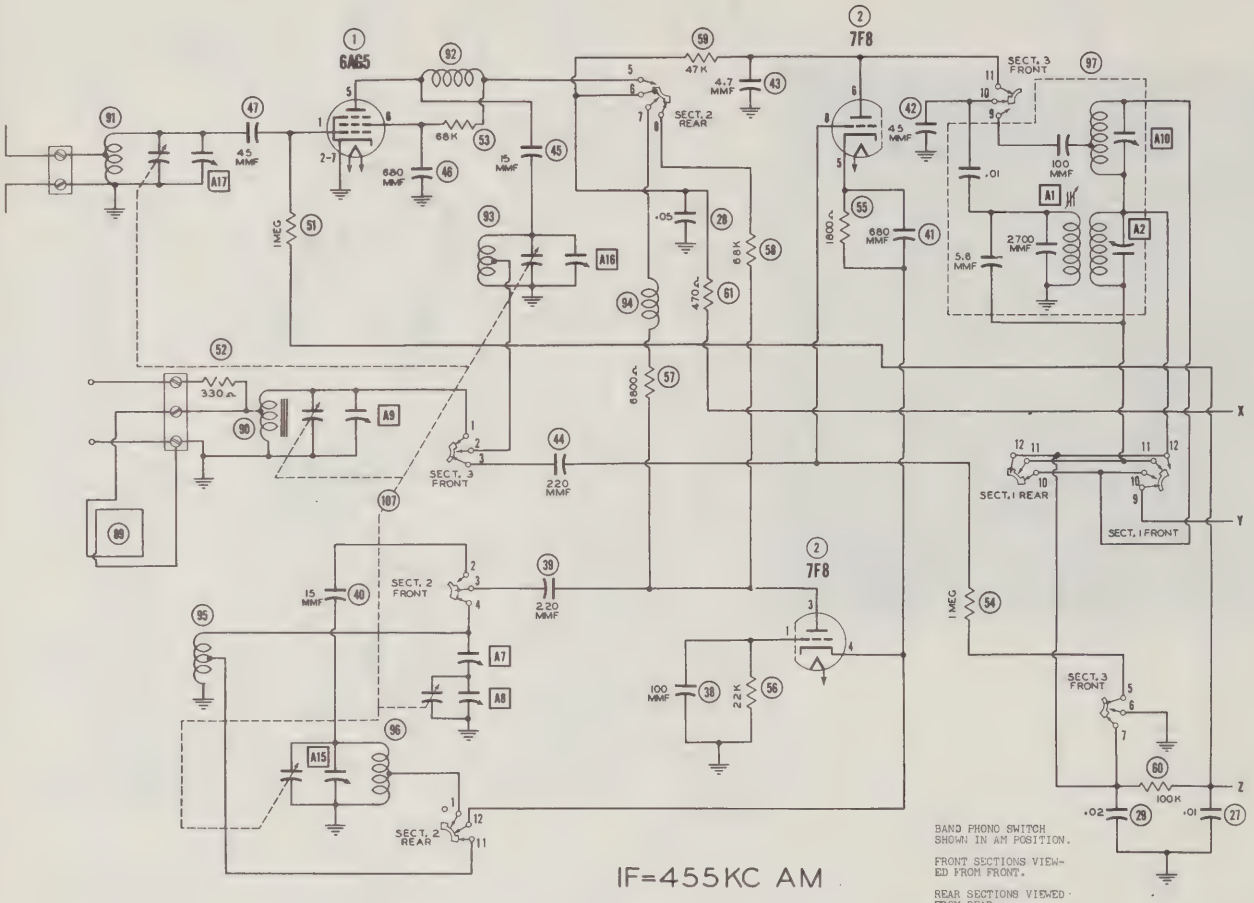


DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove FM antenna leads from terminal strip on back of chassis.
3. Remove phono-pickup plug from chassis.
4. Disconnect phono-motor plug.
5. Remove speaker plug from chassis.
6. Remove three hex nuts and four bolts from under chassis mounting board. Remove chassis from cabinet.
7. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



DATE 7/48-#4812-4 SET #42-FOLDER #4



IF=455KC AM

IF=10.7 MC FM

BAND PHONO SWITCH SHOWN IN AM POSITION.

FRONT SECTIONS VIEWED FROM FRONT.

REAR SECTIONS VIEWED FROM REAR.

SWITCH SEQUENCE:
1. FM
2. AM
3. PHONO

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6AG5	-.6VDC	0V.	0V.	6.3VAC	215VDC	90VDC	0V.	-
2A	7F8	-6VDC§	0V.	77VDC	0V.	4.3VAC	120VDC	6.2VAC	-1.6VDC
‡ 2B	7F8	-4VDC§	0V.	140VAC	0V.	2.7VDC	125VDC	6.2VAC	0V.
3	7AH7	6.3VAC	235VDC	235VDC	0V.	0V.	-.2VDC	.2VDC	0V.
4	7AG7	6.3VAC	237VDC	237VDC	0V.	0V.	0V.	1.6VDC	0V.
‡ 5	6H6	0V.	6.3VAC	19.5VDC	19.5VDC	19.5VDC	20VDC	0V.	21.5VDC
6	6SQ7	0V.	-.7VDC	0V.	-.2VDC	-.4VDC	92VDC	6.3VAC	0V.
7	6V6GT	0V.	6.3VAC	250VDC	240VDC	0V.	0V.	0V.	11VDC
8	5Y3GT	0V.	282VDC	195VDC	260VAC	0V.	260VAC	0V.	282VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6AG5	3.2 Meg.	0Ω	0Ω	.1Ω	52KΩ	120KΩ	0Ω	
2A	7F8	22KΩ	.1Ω	120KΩ	1Ω	1.8KΩ	100KΩ	.2Ω	4.3 Meg.
‡ 2B	7F8	22KΩ	.1Ω	59KΩ	0Ω	1.8KΩ	100KΩ	.2Ω	3.2 Meg.
3	7AH7	.1Ω	52KΩ	52KΩ	0Ω	0Ω	1.3 Meg.	47Ω	0Ω
4	7AG7	.1Ω	52KΩ	52KΩ	0Ω	0Ω	9Ω	220Ω	0Ω
‡ 5	6H6	0Ω	.1Ω	55KΩ	INF.	INF.	52KΩ	0Ω	23KΩ
6	6SQ7	0Ω	10 Meg.	0Ω	2.2 Meg.	260KΩ	370KΩ	.1Ω	0Ω
7	6V6GT	0Ω	.1Ω	50KΩ	50KΩ	470KΩ	INF.	0Ω	270Ω
8	5Y3GT	0Ω	50KΩ	150KΩ	140Ω	INF.	130Ω	0Ω	50KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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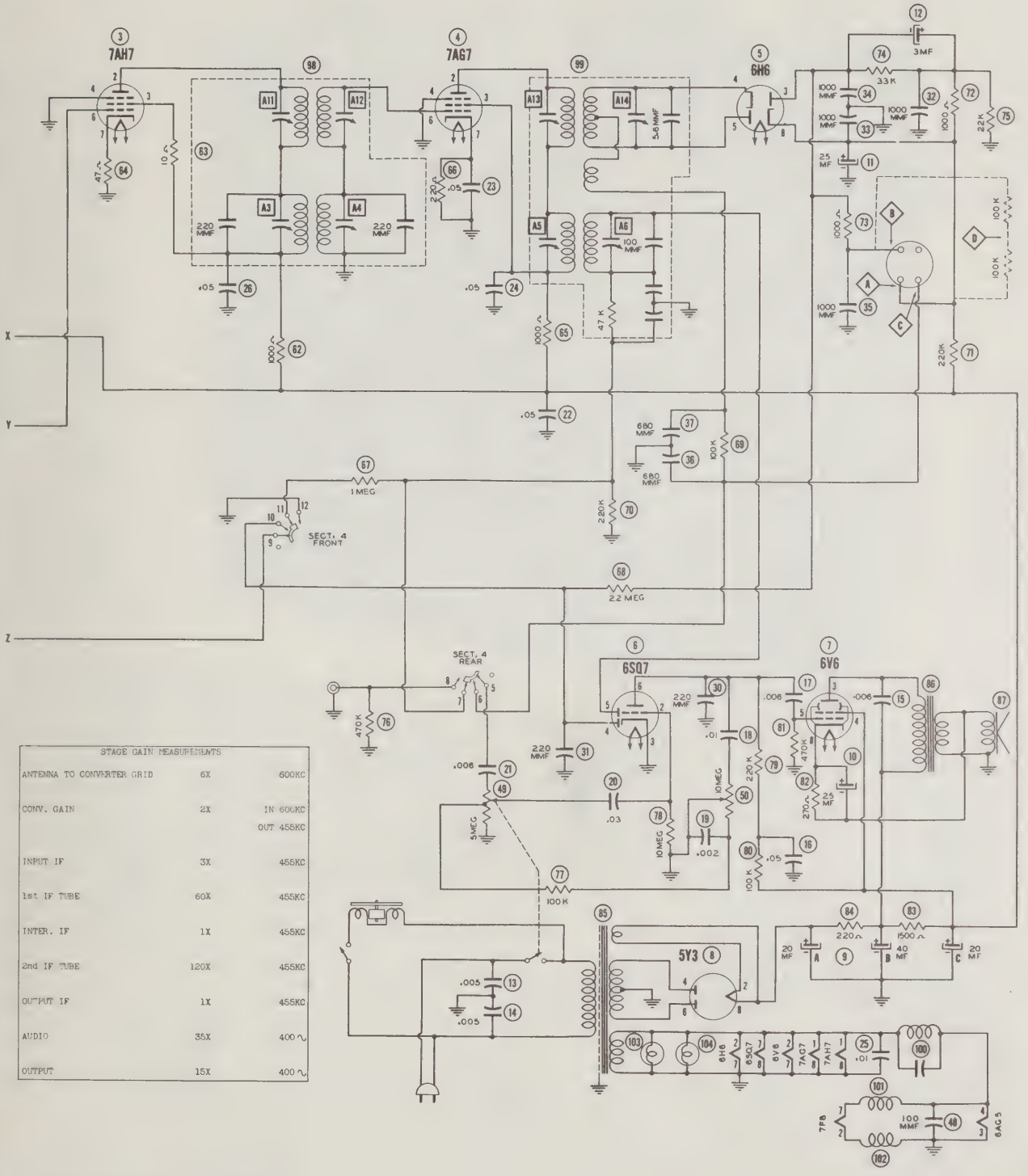
4812-4

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made operative by shorting AVC to chassis.



STAGE GAIN MEASUREMENTS		
ANTENNA TO CONVERTER GRID	6X	600KC
CONV. GAIN	2X	IN 600KC OUT 455KC
INPUT IF	3X	455KC
1st IF TUBE	60X	455KC
INTER. IF	1X	455KC
2nd IF TUBE	120X	455KC
OUTPUT IF	1X	455KC
AUDIO	35X	400 ∿
OUTPUT	15X	400 ∿

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-4

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

FM ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.

VTVM must not be AC-DC or connected to AC line in any manner.

FM dummy antenna consists of 300Ω carbon resistor in series with 30Ω carbon resistor with a .01 MFD cap. connected to the junction of the two resistors. The 300Ω resistor is connected to the ungrounded terminal of the FM antenna terminal strip. The 30Ω resistor is connected to the grounded terminal of FM antenna terminal strip. The 30Ω resistor may be varied to match the output impedance of the signal generator.

In Steps 11 and 12 if calibration is off use following procedure for checking and adjusting inductance of coils. Tune to calibration mark. Connect VTVM to AVC as in Step 7. Insert iron end of tuning wand into FM Osc. Coil (96). If deflection of meter increases compress coils slightly. If deflection decreases insert brass end of wand in coil. If deflection increases spread turns slightly. Coil is adjusted correctly when insertion of either end of tuning wand causes a decrease in deflection of meter. Adjust RF and Ant. Coils (94) and (91) in same manner.

FM ALIGNMENT USING FM SIGNAL GENERATOR OSCILLOSCOPE AND VTVM

Use freq. modulated signal with 60∿ modulation and 300KC sweep.

Connect synchronizing voltage from signal generator to horizontal input of scope. If this voltage is not available it may be obtained from AC power line. Some phase shift may be encountered between the two scope sweep voltages resulting in a double trace pattern such as in Fig. 2. If signal generator or scope has phasing control rotate it to maintain single trace pattern. If this control is not available or synchronizing voltage is taken from power line the same thing may be accomplished by inserting a cap. of suitable value (.01-.1MFD) in series with the scope horizontal synchronizing voltage.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	.05 MFD	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (Unmodulated)	FM (fully counter clockwise)	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to Point Ⓑ.	A10, A11, A12, A13.	Connect a short from front FM stator of tuning cap. to chassis. Adjust for maximum deflection.
						CONNECT SCOPE		
8	.05 MFD	"	Approx. 10.7MC (freq. mod.) Adjust until curve of Fig. 1 is centered on horizontal scope sweep line.	"	"	Vertical input to point Ⓒ. Ground to chassis.	A14	Adjust for maximum symmetry of pattern per Fig. 1. It may be necessary to alternately adjust A13 and A14 to obtain best possible pattern. Remove short from front FM stator of tuning cap.
9	FM Dummy ant. (See pre-alignment notes.)	High side to .01 MFD cap. of dummy. Low side to chassis.	106MC (Freq. modulated	"	106MC reference mark.	"	A15	Adjust until "S" curve of Fig. 1 is centered on horizontal scope sweep line. Check for image by tuning sig. gen. to 84.6MC. If signal is not heard then A15 is adjusted correctly. If signal is heard then retune sig. gen. to 106MC and open A15 until next "S" curve is obtained. Adjust until "S" curve is centered on horizontal scope sweep line and recheck for image.
10	"	"	"	"	"	"	A16, A17	Rock tuning cap. to keep "S" curve centered on horizontal scope sweep line while adjusting A16 and A17 for maximum height of curve.
11	"	"	97MC	"	Tune until "S" curve is centered on scope.	"		Check calibration.
12	"	"	90MC	"	"	"	FM Osc. (96) RF (93) & Ant. (91) Coils.	Check calibration. If calibration is not within reasonable limits coils must be adjusted per pre-alignment notes. If coils are adjusted repeat Steps 9 & 10.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two 100KΩ resistor between Point Ⓐ & Point Ⓑ as shown on schematic. These resistors must be within 1% of each other. The junction of these two resistors is Point Ⓓ.

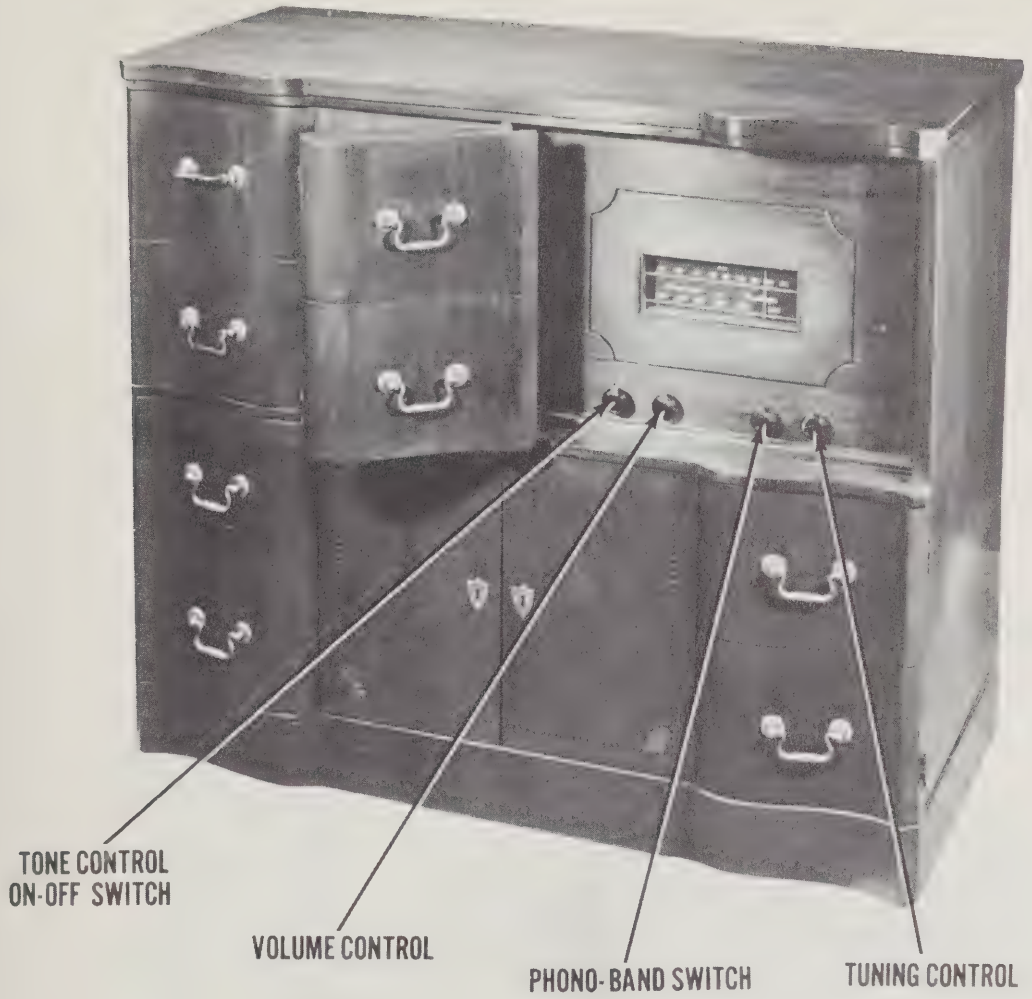
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	.01 MFD	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to Point Ⓑ.	A10, A11 A12, A13	Connect short from front FM stator of tuning cap. to chassis. Adjust for maximum deflection in order given and repeat.
8	.01 MFD	"	"	"	"	DC probe to Point Ⓒ. Common to Point Ⓓ.	A14	Use VTVM with zero center scale if available. Adjust for zero deflection. Repeat Step 7 adjusting A13 only for maximum and Step 8 adjusting A14 only for zero deflection several times to assure correct alignment. Remove short from front FM stator of tuning cap.
9	FM Dummy ant. (See pre-alignment notes)	High side to .01 MFD cap. of dummy. Low side to chassis.	106MC (Amplitude mod.)	"	106MC reference mark.	DC probe to Point Ⓐ. Common to Point Ⓑ.	A15	Adjust for maximum deflection. Check for image as in Alternate, Step 9.
10	"	"	"	"	Tune for maximum deflection.	"	A16, A17	Rock tuning cap. and adjust for maximum deflection.
11	"	"	97MC	"	"	"		Check calibration.
12	"	"	90MC	"	"	"	FM Osc. (96) RF (93) & Ant. (91) Coils	Check calibration. If calibration is not within reasonable limits coils must be adjusted per pre-alignment notes. If coils are adjusted repeat Steps 9 & 10.

Fig. 1

Fig. 2

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

BRUNSWICK MODEL
5000



BRUNSWICK MODEL
5000

BRUNSWICK MODEL 5000

TRADE NAME	Brunswick, Model 5000
MANUFACTURER	Radio & Television Inc., 244 Madison Ave., New York 16, N.Y.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (ELEVEN)	Types, 6BA6 FM RF Amp., 7Q7 AM Converter, 7F8 FM Converter, 7AH7 1st IF Amp., 6SH7 or 7AG7 FM 2nd IF Amp., 7A6 FM Ratio Det., 6SQ7GT Det.-AVC-AF, 7F7 AF-Phase Inv., (2) 7C5 Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.78 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1700KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis 7, Indiana

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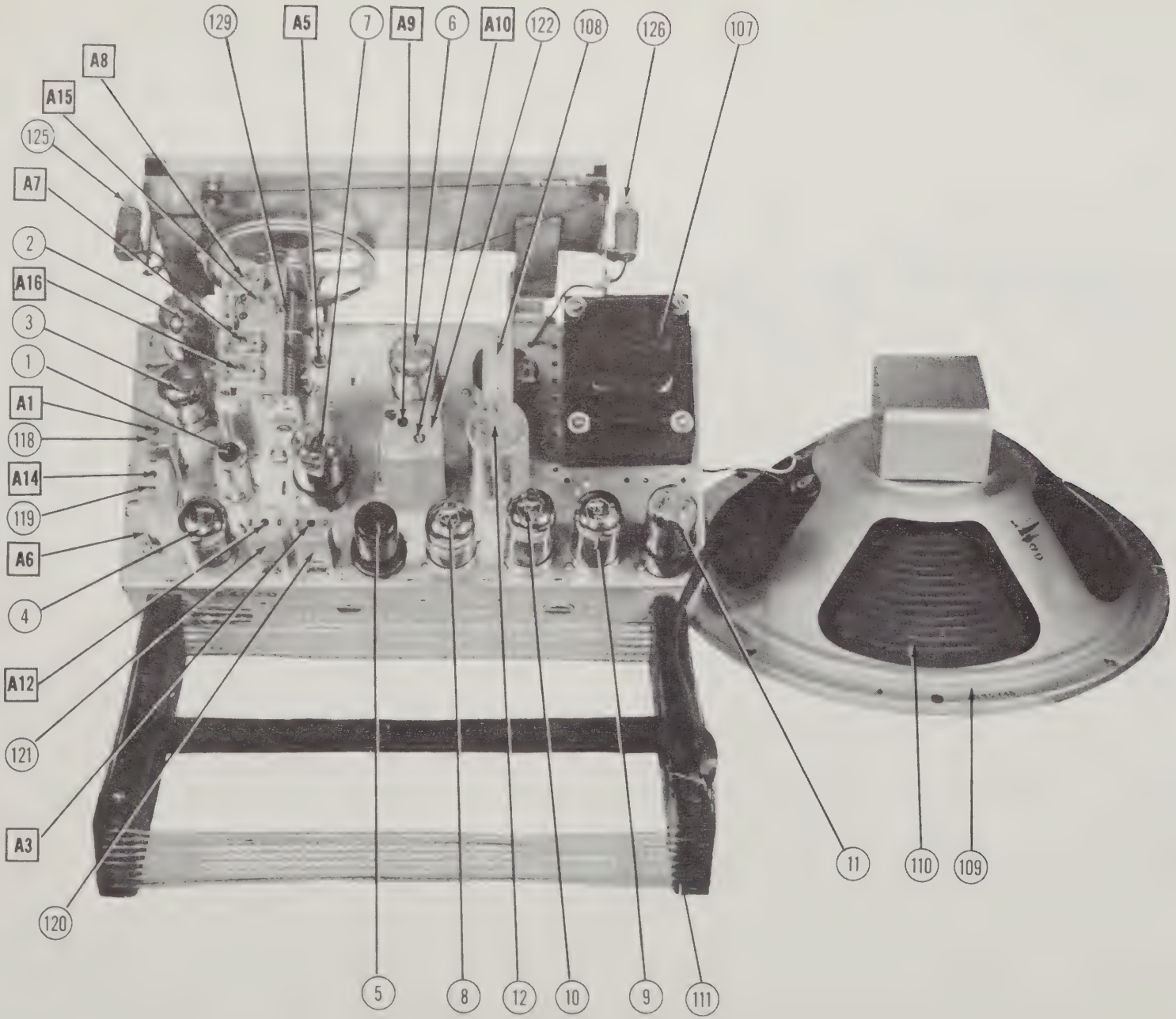
129
A5
7
A9
6
A10
122
108
126
107
A8
A15
125
A7
2
A16
3
1
A1
118
A14
119
A6
4
A12
121
A3
120
5
8
12
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111
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A4
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A11
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114
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A13
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123
A3
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A
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29
86
D
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128
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70
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79
A
B
C
D

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6BA6	6BA6	7BK	
2	AM Converter	7Q7	7Q7	8AL	
3	FM Converter	7F8	7F8	8BW	
4	1st IF Amp.	7AH7	7AH7		
5A	FM 2nd IF Amp.	6SH7	6SH7	8BK	
B	" " " "	7AG7	7AG7		
6	FM Ratio Det.	7A6	7A6	7AJ	
7	Det.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
8	AF-Phase Inv.	7F7	7F7	8AC	
9	Power Output	7C5	7C5	6AA	
10	" "	7C5	7C5	6AA	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12A	40	450		AF88J	UP4445	DY-2x40-450	EL-240	◓ Filter
B	40	450						▲ "
13	8	450		PRS450/8	BR845	M-8-450	UT-8	"
14	4	250		PRS250/4	BR425	M-8-250	UT-42	Stabilizing Cap.
15	.1	300		484-.1	DT4P1	MPH-4-1	TC-1	Line Filter
16	.1	300		484-.1	DT4P1	MPH-4-1	TC-1	" "
17	.002	600		684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
18	.002	600		684-002	DT6D2	ST-6-002	TC-22	" " "
19	.02	200		484-02	DT2S2	ST-4-02	TC-12	Audio Coupling
20	.02	200		484-02	DT2S2	ST-4-02	TC-12	" "
21	.05	200		484-05	DT2S5	ST-4-05	TC-15	" "
22	.05	200		484-05	DT2S5	ST-4-05	TC-15	" "
23	.02	200		484-02	DT2S2	ST-4-02	TC-12	Tone Comp.
24	.5	200		484-.5	DT2P5	ST-2-5	TC-5	Bias Filter
25	.01	150		484-01	DT2S1	ST-4-01	TC-11	2nd IF Cathode Bypass
26	.1	300		484-.1	DT4P1	ST-4-.1	TC-1	AVC Filter
27	.02	200		484-02	DT2S2	ST-4-02	TC-12	RF Bypass Pwr. Supply
28	.02	200		484-02	DT2S2	ST-4-02	TC-12	AM Conv. Screen Bypass
29	6800	300		1467-006	1D3D7	MW.3-27	1FM-27	Tone Comp.
30	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	" "
31	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	" "
32	6800	300		1467-006	1D3D7	MW.3-27	1FM-27	Audio Coupling
33	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	AVC Filter-Cer.
34	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode Load Cap.
35	3000	300		1467-003	1W5D3	MW.5-23	1FM-23	De-emphasis-Cer.
36	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Plate Decoup.-Cer.
37	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Screen Bypass-Cer.
38	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	AVC Filter-Cer.
39	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
40	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
41	6800	300		1467-006	1D3D7	MW.3-27	1FM-27	1st IF Decoupling
42	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	1st IF Cathode Bypass-Cer.
43	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	FM Conv. Plate Decoup.- "
44	25	500		1468-000025	5W5Q25	MO.5-425	MS-425	Osc. Grid Cap.
45	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	Osc. Plate Decoupling-Cer.
46	2	500						Osc. Coupling-Cer.
47	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	FM Conv. Cathode Byp.- "
48	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Coupling-Cer.
49	47	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
50	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass Power Supply "
51	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Screen Bypass-Cer.
52	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Cathode Bypass-Cer.
53	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling
54	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	Filament Bypass-Cer.
55	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	" " "
56	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	" " "
57	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Phono Tone Comp.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
108	10KΩ CT	4Ω	540Ω CT	.4Ω	ZB-15.019	A-3823	T22S56	A-2936	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-102*		*Replace output transformer to match 6-8Ω voice coil.
109	PM	4Ω		Mod. P12-8	12A4*	
	CONE DIA.	VC DIA.				
110	11½"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: MEISSNER PART No.	
111	Loop Ant.		.4Ω	LC5.018		
112	FM Dipole Ant.			LA5.010		
113	FM Ant.Coil	.1Ω	.2Ω	LA2.241		
114	Loop Load. Coil		1.6Ω	LA2.273		
115	FM RF Coil		.4Ω	LA2.243		
116	BC Osc.Coil	.5Ω	4.8Ω	LA2.221	14-1060	
117	FM " "	0Ω	0Ω	LA2.222		
118	AM 1st IF	14.5Ω	14.5Ω	ZB2.275	16-6678	
119	FM " "	.5Ω	.5Ω	ZB2.276		
120	AM 2nd IF	14.5Ω	14.5Ω	ZB2.275	16-6678	
121	FM " "	.5Ω	.5Ω	ZB2.276		
122	FM Ratio Det.	.5Ω	.5Ω	ZC2.278		
123	RF Choke Coil		0Ω	LA2.279		
124	"		.1Ω*	LA2.242		*Wound on 1KΩ resistor

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA	INSTALLATION NOTES
125	Bayonet	6-8	0.15	Brown			Type 47
126	"	"	"	"			" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: BRUNSWICK PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
127		Nylon 1-J	"Nylon 1-J" original part.

MISCELLANEOUS

ITEM No.	PART NAME	BRUNSWICK PART No.	NOTES
128	Switch		Band-Phono
129	Tuning Gang	C6.012	AM (45-500MMF, 45-500MMF)

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BRUNSWICK PART No.	IRC PART No.	CLAROSTAT PART No.	
58A	500KΩ	½	RA-9.069	D18-133X	T-88	Volume Control tapped @ 50KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 58A per instructions
59A	1 Meg.	½	RA-9.070	D13-137	M-63-2	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 59A per instructions
C	Switch		" "	41	SW-A	" " " " "

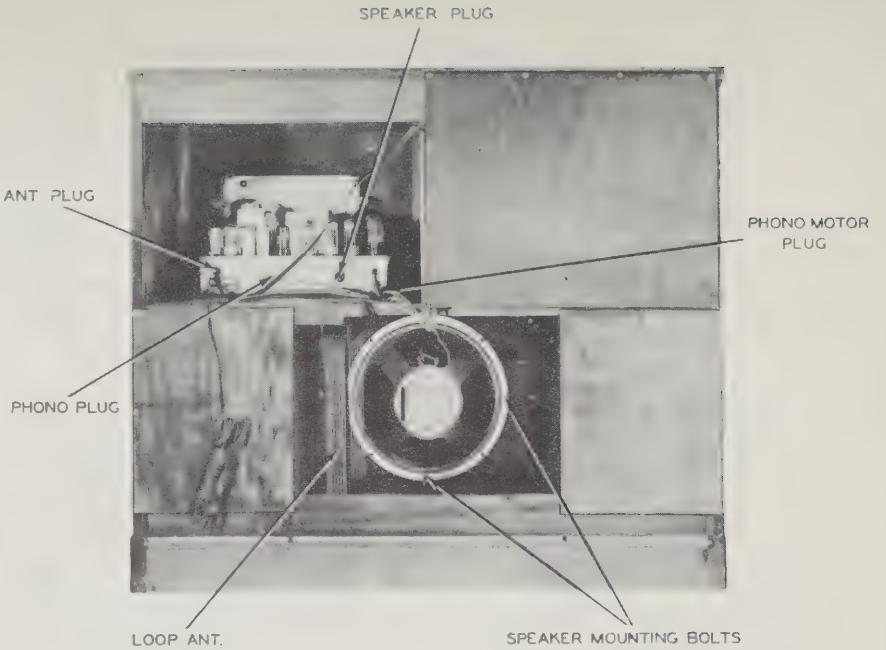
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BRUNSWICK PART No.	IRC PART No.	
60	1000Ω	½		BTS-1000	Br.-Blk.-Red Ext. Ant. Loading
61	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AM Converter Grid
62	22KΩ	½		BTS-22K	Red-Red-Or. AM Oscillator Grid
63	15KΩ	2		BT-2-15K	Br.-Grn.-Or. Decoupling
64	120Ω	¼		BW-½-120	Br.-Red-Br. FM Cathode
65	22KΩ	¼		BTS-22K	Red-Red-Or. FM RF Screen Dropping
66	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. FM Converter Grid
67	47Ω	¼			Yl.-Vi.-Blk. FM Converter Cathode
68	470Ω	¼		BTS-470	Yl.-Vi.-Br. FM Converter Cathode
69	22KΩ	¼		BTS-22K	Red-Red-Or. FM Oscillator Grid
70	2000Ω	1		BTA-2200	Red-Blk.-Red FM Oscillator Plate Decoupling
71	2200Ω	¼		BTS-2200	Red-Red-Red FM Converter Plate Decoupling
72	120Ω	¼			Br.-Red-Br. 1st IF Cathode
73	2000Ω	1		BTA-2200	Red-Blk.-Red 1st IF Decoupling
74	2.2 Meg.	¼		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
75	2.2 Meg.	¼		BTS-2.2 Meg.	Red-Red-Grn. " "
76	47KΩ	¼		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
77	220KΩ	¼		BTS-220K	Red-Red-Yl. AVC Network
78	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. " "
79	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. Diode Load
80	120Ω	¼			Br.-Red-Br. 2nd IF Cathode
81	1000Ω	¼		BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
82	10KΩ	¼		BTS-10K	Br.-Blk.-Or. 2nd IF Screen
83	10KΩ	¼		BTS-10K	Br.-Blk.-Or. Ratio Detector Diode Load
84	10KΩ	¼		BTS-10K	Br.-Blk.-Or. " " " "
85	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. Bias Network
86	220KΩ	¼		BTS-220K	Red-Red-Yl. AVC Network
87	100KΩ	¼		BTS-100K	Br.-Blk.-Yl. " "
88	10KΩ	¼		BTS-10K	Br.-Blk.-Or. Tone Compensation
89	6.8 Meg.	¼		BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
90	220KΩ	¼		BTS-220K	Red-Red-Yl. AF Plate Load
91	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. Tone Comp.
92	220KΩ	¼		BTS-220K	Red-Red-Yl. 2nd AF Grid
93	2000Ω	1		BTA-2200	Red-Blk.-Red 2nd AF Cathode
94	10Ω	¼		BW-½-10	Br.-Blk.-Blk. 2nd AF Cathode
95	100KΩ	¼		BTS-100K	Br.-Blk.-Yl. Phase Inv. Cathode
96	470KΩ	¼		BTS-470K	Yl.-Vi.-Yl. Phase Inv. Grid
97	220KΩ	¼		BTS-220K	Red-Red-Yl. 2nd AF Plate Load
98	100KΩ	¼		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
99	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
100	120Ω	¼		BW-½-120	Br.-Red-Br. Feedback
101	220KΩ	¼		BTS-220K	Red-Red-Yl. Output Grid
102	220KΩ	¼		BTS-220K	Red-Red-Yl. " "
103	220Ω	¼		BW-½-220	Red-Red-Br. Output Cathode
104	2200Ω	10		AB-2250	Red-Red-Red Filter
105	2.2 Meg.	¼		BTS-2.2 Meg.	Red-Red-Grn. Phono Tone Comp.
106	47KΩ	¼		BTS-47K	Yl.-Vi.-Or. Phono Shunt
130	22KΩ	¼		BTS-22K	Red-Red-Or. De-emphasis

TRANSFORMER (POWER)

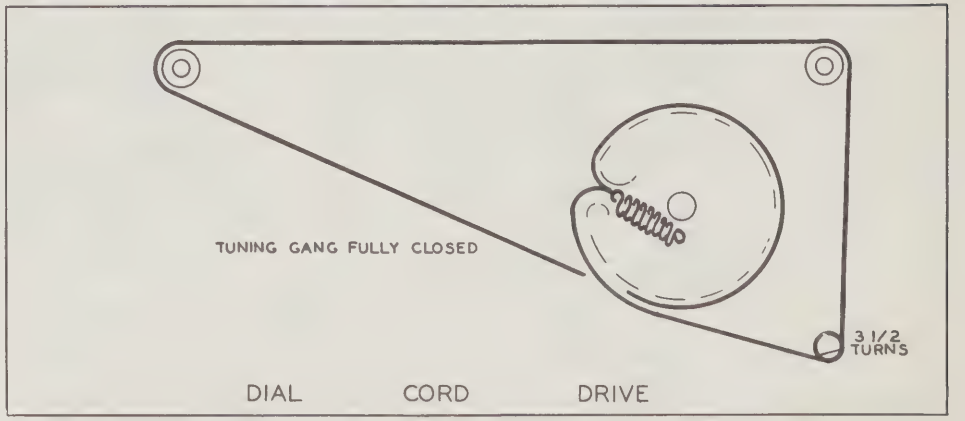
ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BRUNSWICK PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
107	117V AC @ .78A	660V CT .102A DC	5.0V AC @ 2.0A	6.3V AC @ 3.25A	TA-13.053	P-6013‡#	T-22R05#	P-2553‡#

#Drill new mounting holes.
‡Add series resistor to reduce plate voltage.

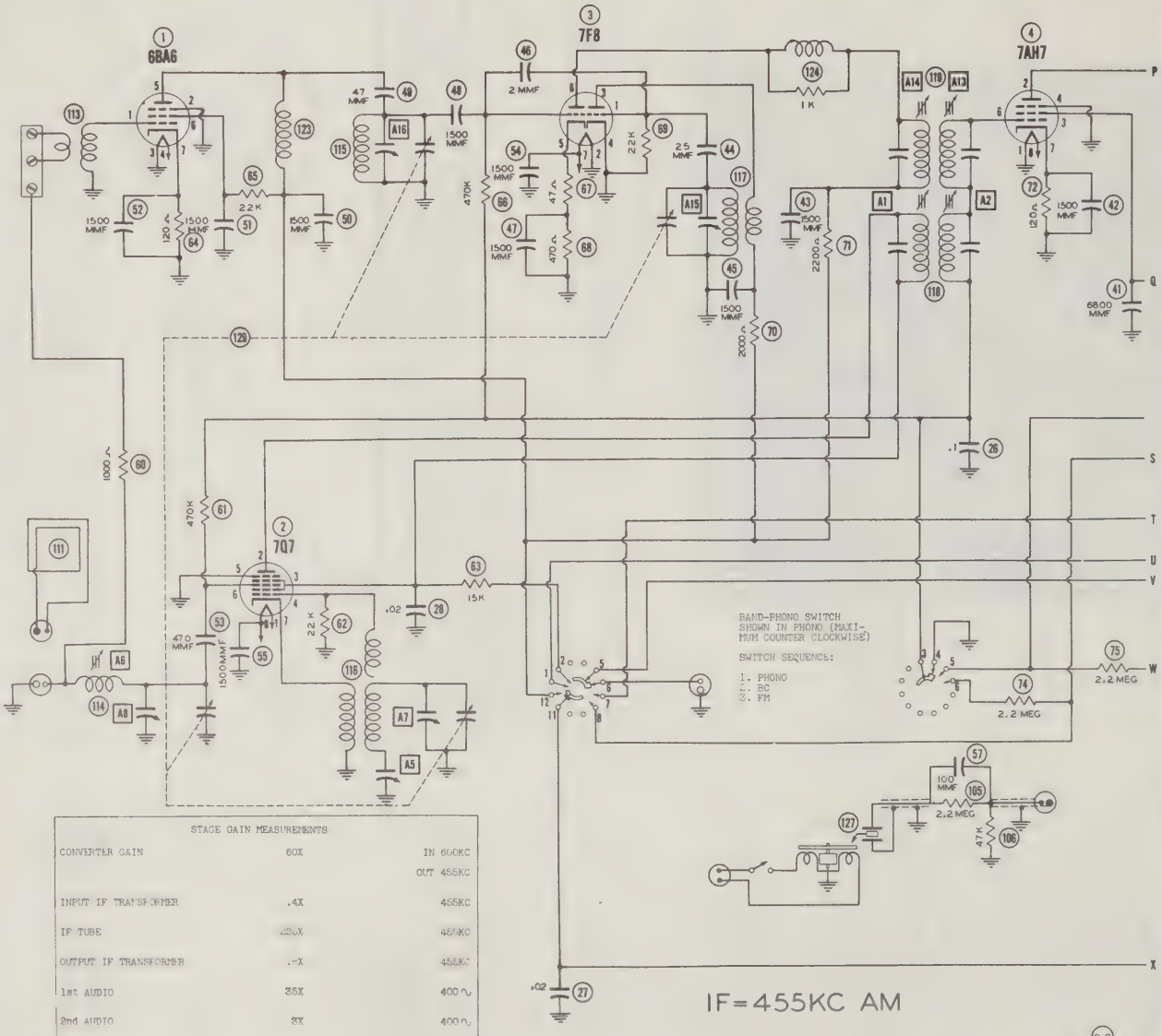


DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs. Loosen set screw and remove band switch control knob.
2. Remove speaker plug from chassis.
3. Disconnect phono-motor plug.
4. Remove phono-pickup plug from chassis.
5. Remove loop antenna plug from chassis.
6. Remove FM antenna leads from terminal strip on rear of chassis.
7. Remove two long bolts holding loop antenna in cabinet. Remove loop from cabinet.
8. Remove four bolts holding chassis in cabinet. Remove chassis from cabinet.
9. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



DATE 7/48-#4812-5 SET #42-FOLDER #5



STAGE GAIN MEASUREMENTS

CONVERTER GAIN	60X	IN 600KC OUT 455KC
INPUT IF TRANSFORMER	.4X	455KC
IF TUBE	220X	455KC
OUTPUT IF TRANSFORMER	.4X	455KC
1st AUDIO	35X	400 ∿
2nd AUDIO	8X	400 ∿
PHASE INVERTER	.6X	400 ∿
OUTPUT	30X	400 ∿

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6BA6	0V.	0V.	0V.	6.3VAC	.21VDC	1.25VDC	1.5VDC	-
2	7Q7	0V.	55VDC	95VDC	-9.5VDC§	0V.	0V.	0V.	6.3VAC
‡ 3	7F8	-5VDC§	0V.	195VDC	0V.	2.9VDC	240VDC	6.3VAC	0V.
4	7AH7	0V.	238VDC	238VDC	0V.	0V.	0V.	1.3VDC	6.3VDC
‡ 5	6BH7	0V.	0V.	1.3VDC	0V.	1.3VDC	130VDC	6.3VDC	180VDC
‡ 6	7A6	0V.	2.6VDC	2.2VDC	-.2VDC	0V.	.6VDC	2.2VDC	6.3VAC
7	6BQ7GT	0V.	-.5VDC	0V.	-.3VDC	-.1VDC	105VDC	0V.	6.3VAC
8	7F7	0V.	80VDC	163VDC	75VDC	0V.	73VDC	1VDC	6.3VAC
9	7F8	0V.	330VDC	250VDC	0V.	0V.	0V.	15VDC	6.3VAC
10	7Q8	0V.	330VDC	250VDC	0V.	0V.	0V.	15VDC	6.3VAC
11	5Y3GT	0V.	335VDC	0V.	330VAC	0V.	330VAC	0V.	335VDC

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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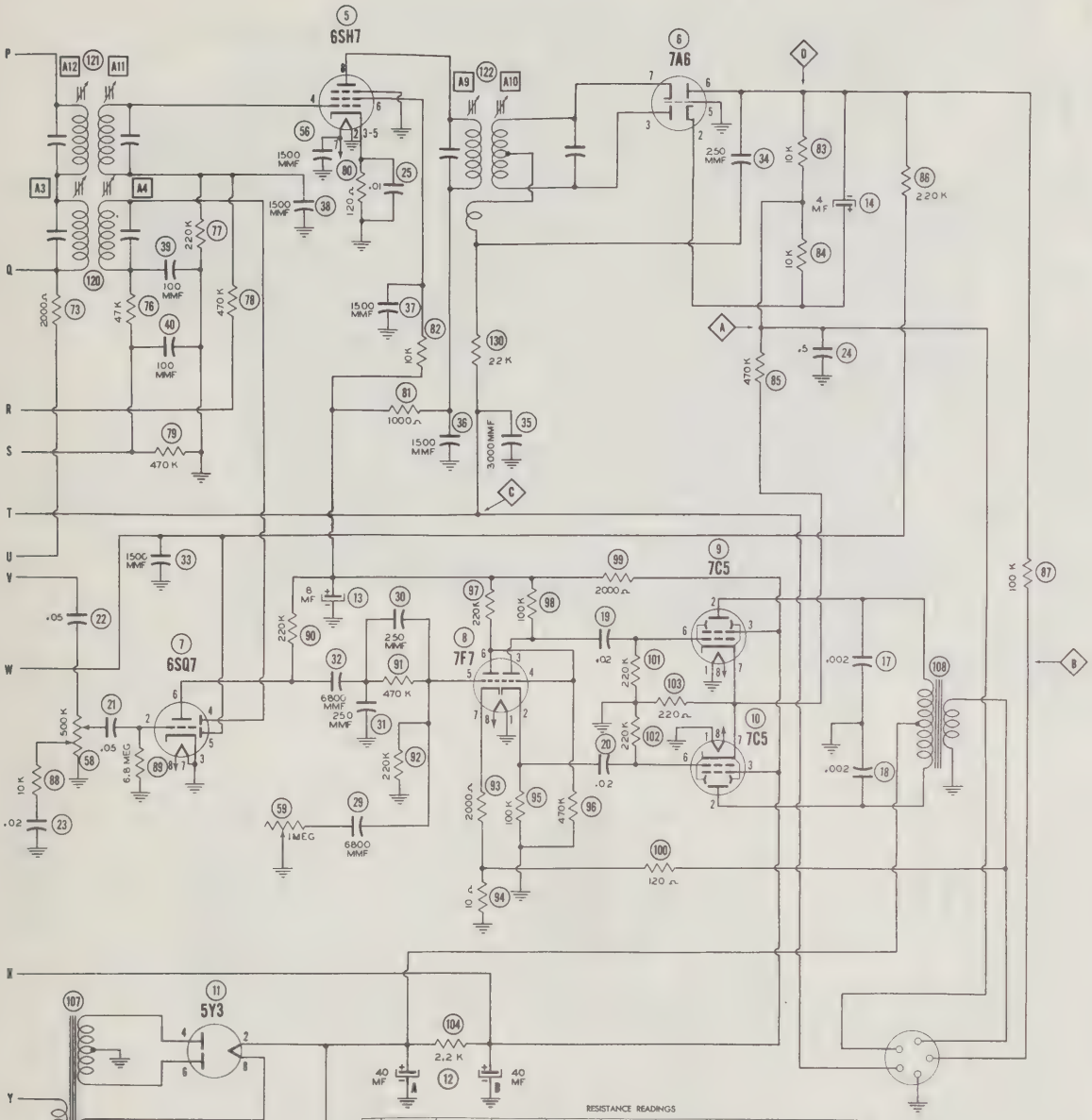
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6BA6	.2Ω	0Ω	0Ω	.05Ω	52KΩ	75KΩ	120Ω	-
2	7Q7	0Ω	67KΩ	67KΩ	22KΩ	0Ω	2.6 Meg.	.5Ω	.05Ω
‡ 3	7F8	22KΩ	0Ω	54KΩ	0Ω	510Ω	54KΩ	.05Ω	1.2 Meg
4	7AH7	0Ω	54KΩ	54KΩ	0Ω	0Ω	2.6 Meg.	120Ω	.05Ω
‡ 5	6SH7	0Ω	0Ω	120Ω	220KΩ	120Ω	65KΩ	.05Ω	55KΩ
‡ 6	7A6	0Ω	480KΩ	INF.	540KΩ	0Ω	480KΩ	INF.	.05Ω
7	6BQ7GT	0Ω	6.8 Meg.	0Ω	510KΩ	570KΩ	270KΩ	0Ω	.05Ω
8	7F7	0Ω	100KΩ	150KΩ	180KΩ	220KΩ	180KΩ	2000Ω	.05Ω
9	7C5	0Ω	50KΩ	52KΩ	INF.	INF.	220KΩ	220Ω	.05Ω
10	7C5	0Ω	50KΩ	52KΩ	INF.	INF.	220KΩ	220Ω	.05Ω
11	5Y3GT	INF.	50KΩ	INF.	130Ω	INF.	130Ω	INF.	50KΩ

‡TAKEN WITH VACUUM TUBE VOLTMETER.

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully open closed and set pointer to last reference mark at low freq. end of dial.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front AM stator of tuning cap. Low side to chassis.	455KC	AM (fully clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	200MMFD	High side to ext. ant. terminal. Low side to chassis.	600KC	"	600KC	"	A5,A6	" " " "
3	200MMFD	"	1600KC	"	1600KC	"	A7	" " " "
4	200MMFD	"	"	"	Tune for max-imum output.	"	A8	Adjust for maximum output. Repeat Steps 2, 3, & 4 until no further improve-ment can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD	High side to Pin 4 (grid) of 6SH7. Low side to chassis.	10.7MC (Unmodu-lated)	FM (center-position)	Tuning cap. fully open.	DC probe to Point (B). Common to Point (A).	A9	Adjust for maximum de-flection.
6	.01 MFD	"	"	"	"	DC probe to Point (C). Common to Point (B).	A10	Adjust for zero deflec-tion. Tune sig. gen. above and below 10.7MC for maximum deflection (approximately 200KC either side) and note meter readings. They should be approx. equal. If not then it will be necessary to readjust A9 until the two readings are approx. equal.
						OUTPUT METER		
7	.01 MFD	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	10.7MC (400∿ Amp. modulation)	FM (center position)	Tuning cap. fully open.	Across voice coil	A11, A12	Connect 1000Ω carbon re-sistor across primary of ratio detector transform-er (122). Adjust A11 & A12 for maximum output.
8	.01 MFD	High side to Pin 8 (grid) of 7F8. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum output. Remove 1000Ω resistor. Continue with FM-RF Alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5	.01 MFD	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	10.7MC (Freq. modulated)	FM (center-position)	Tuning cap. fully open.	Vertical input to Point (D). Ground to chassis.	A9,A11, A12	Disconnect 4 MFD cap. from Point (D). Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD	Disconnect cap. (48) from Pin 8 (grid) of 7F8. High side of sig. gen. to pin 8 of 7F8. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum ampli-tude, symmetry and coin-cidence of pattern per Fig. 1. Reconnect 4 MFD cap. to Point D and cap. (48) to Pin 8 of 7F8.
7	.01 MFD	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	"	"	"	Vertical input to Point (C). Ground to chassis.	A10	Adjust for maximum straightness of crossover lines with crossover oc-curring at center of pattern per Fig. 2. Con-tinue with FM-RF Align-ment in Step 9.

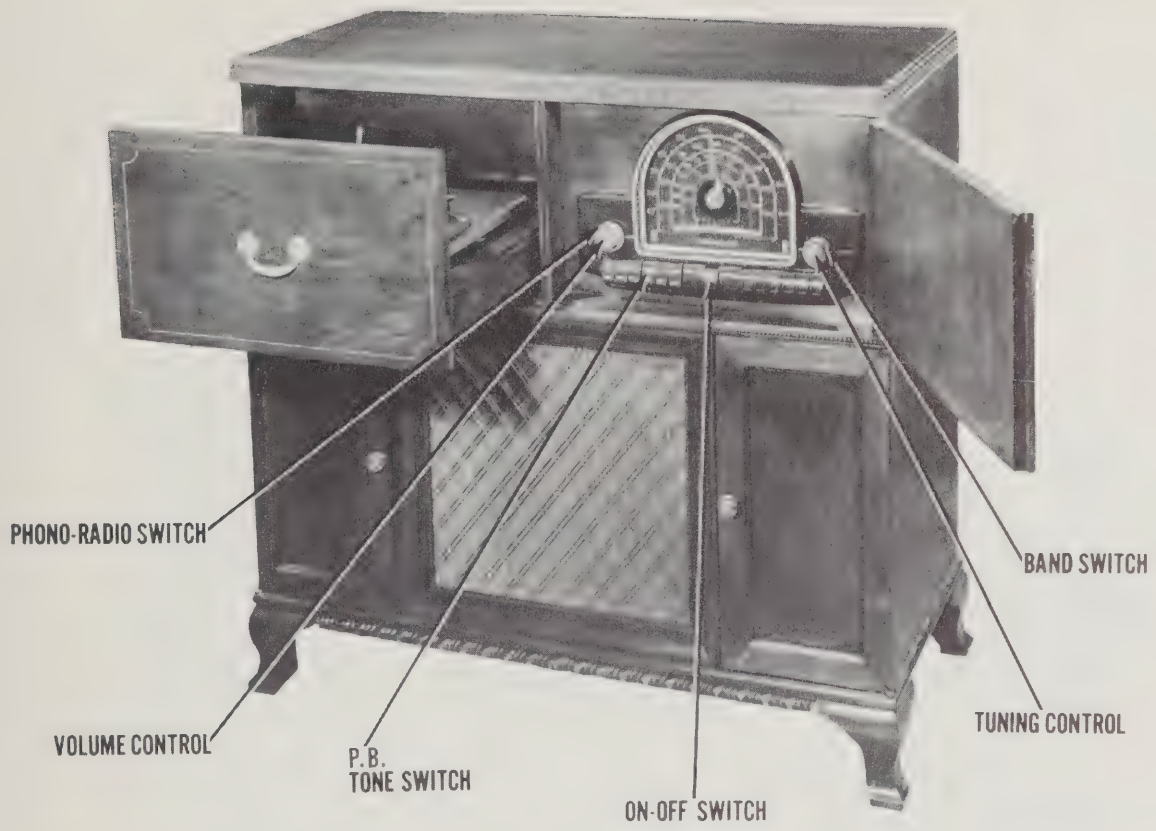
FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	2-150Ω carbon res.	Across FM dipole terminals "A1" & "A2".	108MC (Unmodula-ted)	FM	108MC	DC probe to Point (B). Common to Point (A).	A15	Adjust for maximum de-flection.
10	"	"	"	"	Tune for maximum out-put.	"	A16	Adjust for maximum de-flection. Repeat Steps 9 & 10 until no further im-provement can be made.
11	"	"	90MC	"	Tune for max. deflection.	"	FM-RF Coil (115)	Compress or expand turns slightly for maximum de-flection. Repeat Steps 10 & 11 until no further improvement can be made.

FIG. 1

FIG. 2

CROSLEY MODELS
148CP, 148CQ



CROSLEY MODELS
148CP, 148CQ

CROSLEY MODEL 148CP

TRADE NAME	Crosley, Models 148CP, 148CQ
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated Phono-Radio, FM-Multi-Band AM Superheterodyne Receiver with Loop Antenna
TUBES (FOURTEEN)	Types, 6SG7 RF Amp., 6SA7 AM Converter, 6AC7 FM Mixer, 7F8 FM Osc., 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6SH7 3rd IF Amp., 6H6 Disc., 6E5 Tuning Eye, 6SQ7 Det.-AVC-AF, 6SQ7 Phase Inv., (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	1.13 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535-1620KC SHORT WAVE 2.25-6.7MC, 6.7-18.5MC FM 88.1-107.9MC

PUSHBUTTON ADJUSTMENTS

The ranges of the button in order from left to right are: 540-900KC, 590-1000KC, 680-1150KC, 750-1300KC, 880-1500KC, 1000-1620KC.

1. Turn receiver on and allow to warm up for at least fifteen minutes.
2. Remove knobs from all the buttons.
3. Rotate B1 counter-clockwise until screw extends 3/4". Adjust B2 clockwise until almost tight.
4. Turn band switch to AM and manually tune in the selected station making sure that the frequency of the station falls within the range of the button to be set up.
5. Turn bandswitch to "auto" and adjust B1 to tune in station selected. Adjust B2 for maximum volume.
6. Check accuracy of setting by switching alternately from "auto" to AM.
7. Insert call letter tab in knob.
8. For the remaining buttons follow the procedure outlined above.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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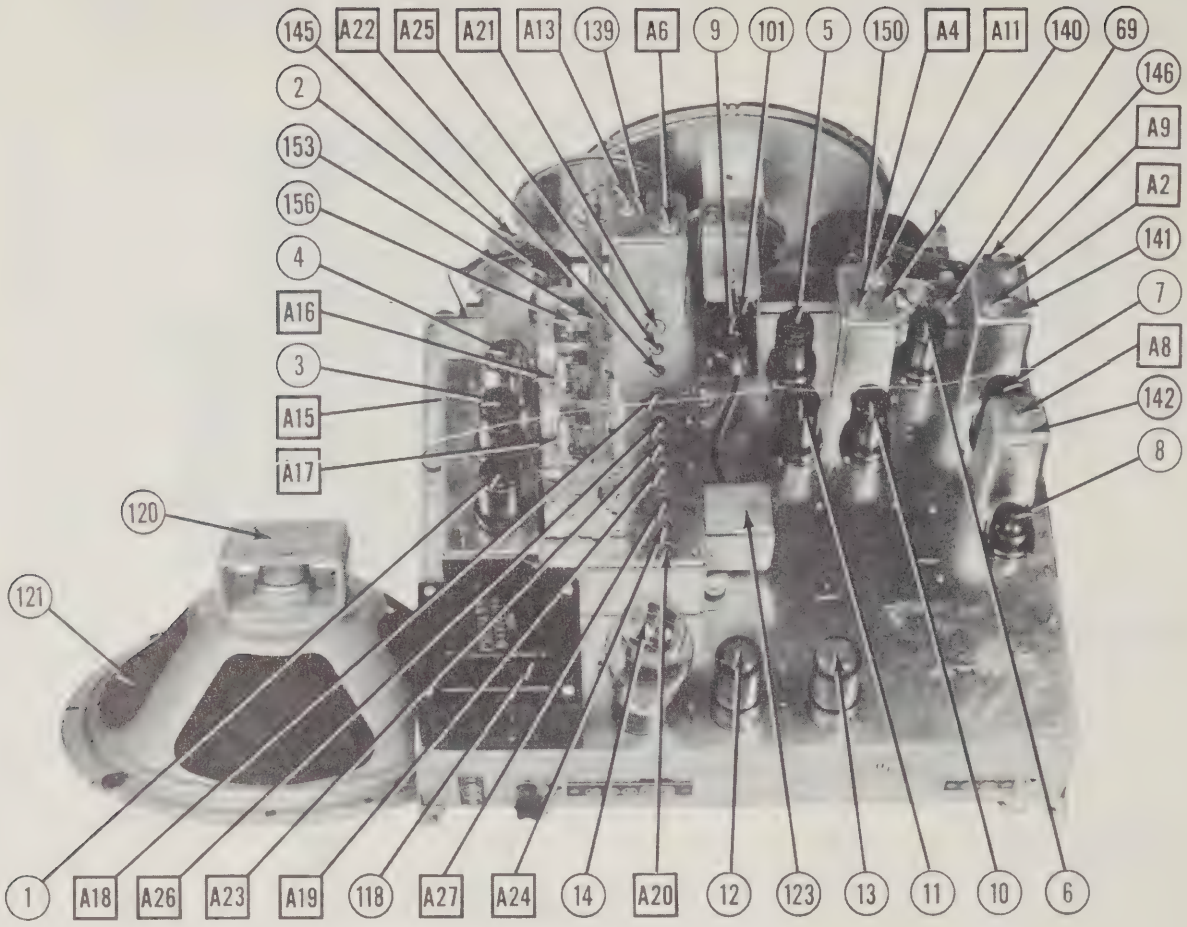
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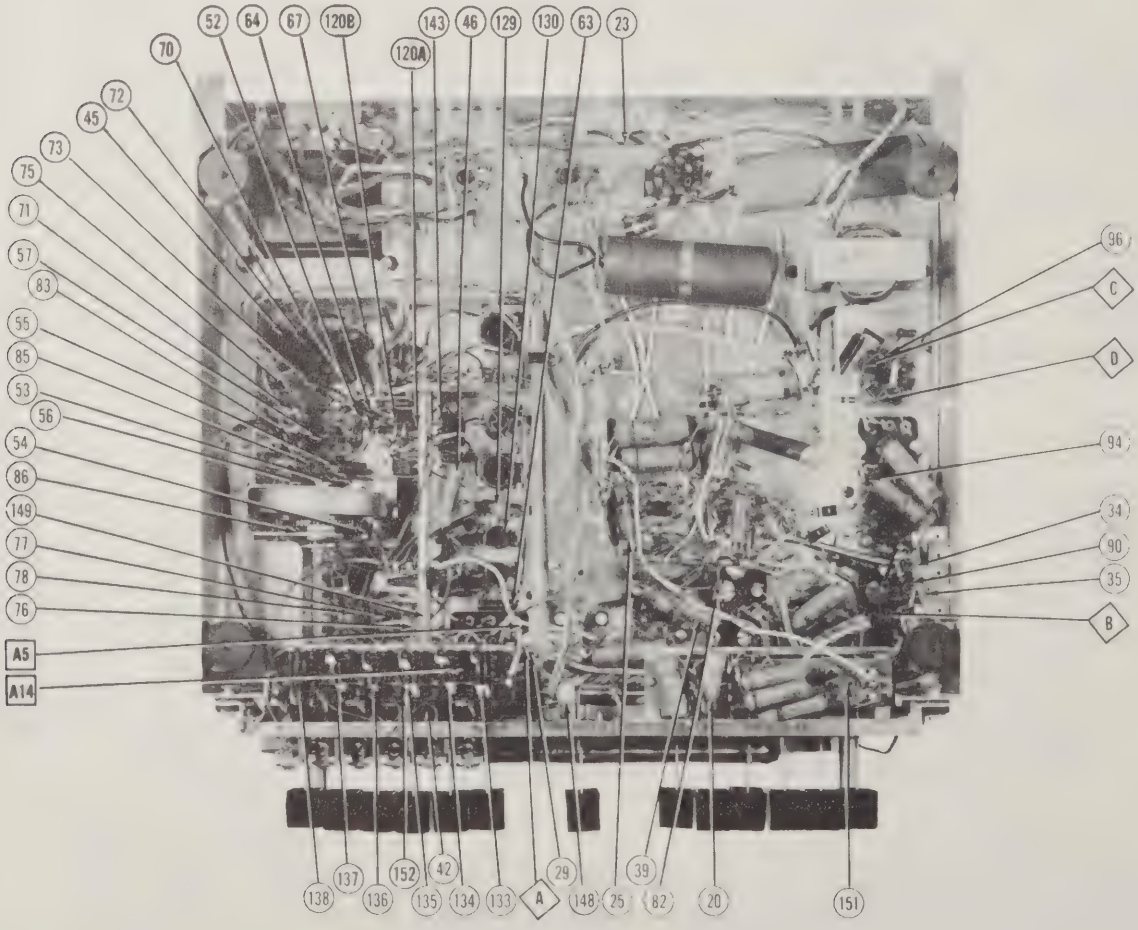
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SG7	6SG7	8BK	
2	AM Converter	6SA7	6SA7	9R	
3	FM Mixer	6AC7	6AC7	9N	
4	FM Oscillator	7F8	7F8	9BW	
5	1st IF Amp.	6SG7	6SG7	8BK	
6	2nd IF Amp.	6SG7	6SG7	8BK	
7	3rd IF Amp.	6SH7	6SH7	8BK	
8	Discriminator	6H6	6H6	7Q	
9	Tuning Eye	6E5	6E5	6R	
10	Det.-AVC-AF	6SQ7	6SQ7	8Q	
11	Phase Inv.	6SQ7	6SQ7	8Q	
12	Power Output	6V6GT	6V6GT	7AC	
13	Power Output	6V6GT	6V6GT	7AC	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
15A	40	400	B-137003	PRS450-40	BR4045	M-40-450	UT-40	Filter-Red
B	20	25		PRS25-25	BR202A	M-25-25	TA-25	Cathode Bypass-Blue
16A	50	400	B-137002	PRS450-40	BR4045	M-40-450	UT-40	Filter-Red
B	10	300		PRS350-12	BR1335	M-10-350	UT-123	Decoupling-Blue
17	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	Tone Comp.
18	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	" "
19	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	" "
20	.005	600	39001-11	684-005	DT6D5	ST-6-005	TC-25	" "
21	.005	600	39001-11	684-005	DT6D5	ST-6-005	TC-25	" "
22	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
23	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	" " "
24	.05	600	39001-17	684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
25	.008	600		684-0075	DT6D6	ST-6-006	TC-26	" "
26	.0001	600	39001-1	1468-0001	DT6T1	MO.5-31	TC-31	AF Plate Bypass
27	.05	600	39001-17	684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
28	.008	600		684-0075	DT6D6	ST-6-006	TC-26	" "
29	.05	600	39001-17	684-05	DT6S5	ST-6-05	TC-15	" "
30	.05	600	39001-17	684-05	DT6S5	ST-6-05	TC-15	RF Bypass Power Supply
31	.03	200		484-03	DT4S3	ST-4-03	TC-13	3rd IF Screen Bypass
32	.05	200	39001-17	484-05	DT4S5	ST-4-05	TC-15	3rd IF Plate Decoup.
33	.01	200	39001-13	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
34	.0001	600	39001-1	1468-0001	DT6T1	MO.5-31	TC-31	" "
35	.0001	600	39001-1	1468-0001	DT6T1	MO.5-31	TC-31	Diode RF Filter
36	.01	600	39001-13	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoupling
37	.03	200		484-03	DT4S3	ST-4-03	TC-13	2nd IF Cathode Bypass
38	.01	600	39001-13	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
39	.01	600	39001-13	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
40	.05	400	39001-17	484-05	DT4S5	ST-4-05	TC-15	1st IF Screen Bypass
41	.05	200	39001-17	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
42	.01	600	39001-13	684-01	DT6S1	ST-6-01	TC-11	Decoupling
43	.01	600	39001-13	684-01	DT6S1	ST-6-01	TC-11	Conv. Screen Bypass
44	.0001	600	39001-1	1468-0001	DT6T1	MO.5-31	TC-31	RF Coupling
45	.05	600	39001-17	684-05	DT6S5	ST-6-05	TC-15	AVC Filter
46	.0001	600	39001-1	1468-0001	DT6T1	MO.5-31	TC-31	RF Coupling
47	1000	300	B-226638-31	1468-001	1W5D1	MO.5-21	1FM-21	Fil. Bypass-Cer.
48	75	500	B-226638-54	1468-000075	5W5Q7	MOS.5-47	1FM-475	De-emphasis "
49	75	500	B-226638-54	1468-000075	5W5Q7	MOS.5-47	1FM-475	RF Bypass "
50	100	500	B-226638-2	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
51	220	500	39004-9	1468-0002	5W5T2	MO.5-32	1FM-32	IF Coupling
52	100	300	B-22663B-31	1468-0001	1W5T1	MO.5-31	1FM-31	Screen Bypass-Cer.
53	100	500	B-226638-2	1468-0001	5W5T1	MO.5-31	1FM-31	Fil. Bypass-Cer.
54	500	400	G-131502-5	1469-0005	5R5T5	MOS.5-35	MS-35	Osc. Feedback-Silver
55	500	400	G-131502-5	1469-0005	5R5T5	MOS.5-35	MS-35	" " "
56	100	500	B-226638-2	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Decoupling-Cer.
57	1	500	W-137398-2					Osc. Coupling-Cer.
58	75	500	B-226638-54	1468-000075	5W5Q7	MOS.5-47	1FM-475	Osc. Grid Cap.-Cer.
59	550	500		1469-0005	5R5T5	MOS.5-35	MS-35	Osc. Feedback-Silver
60	3300	500	GC-210685-168					" "
61	4140	500	GC-210685-178					Fixed Padder
62	1460	500	GC-210685-179					" "
63	300	500	C-137727-64		5R5T3	MO.5-33	MS-33	" "

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
118	117V AC @ 1.13A	640V CT .145A DC	5.0V AC @ 3.0A	6.3V AC @ 4.6A	B-135000	P-6014	T22R06	P-2954

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
119	22KΩ CT	4.3Ω	470Ω CT	.4Ω	B-137001	A-3824	T22S88	A-2904†	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-102*		*Replace output transformer to match 6-8Ω voice coil.
120	PM	4.3Ω	C-137058	Mod. P12-S	12A4*	
	CONE DIA.	VC DIA.				
121	11½"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: MEISSNER PART No.	
122	Loop Assy.		.1Ω	W139692		
123	BC Ant.Coil	64Ω	3Ω	AW136396		
124A	Pol. " "	.5Ω‡	.5Ω	AW136411		‡Wound on same form with common primary
B	SW " "		.1Ω	AW136411		
125A	FM " " Pri.	0Ω		AB137433		
B	FM Ant.Coil Sec.		0Ω	AW136737		
126	BC RF Coil	70Ω	10Ω	AW136362	14-1057	
127A	Pol." "	.2Ω‡	.6Ω	AW136406		
B	SW " "		0Ω			
128A	FM " " Pri.	0Ω		AW136732		
B	FM RF Coil Sec.		0Ω	AW138245		
129	BC Osc.Coil		6Ω	AW136364	14-1060	
130	Pol. " "		.3Ω	AW136393		
131	SW " "		.1Ω	AW136392		
132	FM " "		0Ω	AW136682		
133	PB Osc. Coil #1		.7Ω	AW134092		
134	" " #2		.7Ω	AW134089		
135	" " #3		.7Ω	AW134230		
136	" " #4		.7Ω	AW134231		
137	" " #5		.7Ω	AW134090		
138	" " #6		.7Ω	AW134091		
139A	AM 1st IF	3.2Ω	4Ω	AC136073		
B	FM " "	.3Ω	.3Ω			§Includes resistance of FM winding.
140A	AM 2nd IF	4Ω§	4Ω§	AC136059		
B	FM " "		.3Ω			
141A	AM 3rd IF	4.1Ω§	4Ω	AC136112		
B	FM 3rd IF		.3Ω			
142	Ft. Disc. Trans.	.1Ω	.1Ω	AC136090		
143	RF Choke		0Ω	AW136726		
144	" "		.1Ω	AW136720		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: CROSLEY PART No.		INSTALLATION NOTES
145	Bayonet	7.5	0.2A	White	W-43567		Type 51
146	"	"	"	"	"		" "

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
64	100	500	39004-7	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
65	100	500	39004-7	1468-0001	5R5T1	MOS.5-31	MS-31	Fixed Trimmer
66	220	500	39004-9	1468-0002	5W5T2	MO.5-32	1FM-32	RF Bypass
67	1000	300	B-226638-31	1468-001	1W5D1	MO.5-21	1FM-21	RF Screen Bypass-Cer.
68	50	500	B-226638-53	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling "
154	11.5	500	C-137727-68					Fixed Trimmmer "

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	
69A	2.5 Meg.	½	39368-19	D18-139X		Volume Control tapped @ 750KΩ
B	Shaft		39370-1	A#		Attach to 69A per instructions
			B135828**			

**Replaces both control and shaft.
#Use original sleeve over shaft to actuate radio-phono-sw.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
70	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
71	22KΩ	1	39373-170	BTA-22K	Red-Red-Or. RF Screen
72	68KΩ	½	39373-71	BTS-68K	Blue-Gray-Or. Bleeder
73	1.5 Meg.	½	39373-94	BTS-1.5 Meg.	Br.-Grn.-Grn. Mixer Grid
74	120KΩ	½	39373-75	BTS-120K	Br.-Red-Yl. Mixer Screen
75	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. AVC Network
76	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. Conv. Grid
77	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Osc. Grid
78	100Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Decoupling
79	18KΩ	2	39373-278	BT-2-18K	Br.-Gray-Or. Conv. Screen
80	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. 1st IF Grid
81	6800Ω	½	39373-51	BTS-6800	Blue-Gray-Red 1st IF Screen
82	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
83	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Decoupling
84	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. FM Osc. Grid
85	22KΩ	1	39373-170	BTA-22K	Red-Red-Or. FM Osc. Plate
86	22KΩ	1	39373-170	BTA-22K	Red-Red-Or. " " "
87	220Ω	½	39373-19		Red-Red-Brn. 2nd IF Cathode
88	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red 2nd IF Plate
89	1.5 Meg.	½	39373-94	BTS-1.5 Meg.	Br.-Grn.-Grn. AVC Network
90	150KΩ	½	39373-77	BTS-150K	Br.-Grn.-Yl. Diode Filter
91	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. Diode Load
92	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. 3rd IF Grid
93	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. AVC Network
94	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red 3rd IF Plate Decoupling
95	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. Disc. Diode Load
96	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. " " "
97	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. De-emphasis
98	4700Ω	1	39373-157	BTA-4700	Yl.-Vi.-Red Voltage Dropping
99	6200Ω	2	39372-10	BT-2-5600	Blue-Red-Red " "
100	3900Ω	1	39373-155	BTA-3900	Br.-White-Red Bleeder
101	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Ind. Plate Load
102	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Vol. Cont. Shunt
103	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue 1st AF Grid
104	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. 1st AF Plate Load
105	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue Phase Inv. Grid
106	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. Phase Inv. Plate Load
107	330KΩ	½	39373-84	BTS-330K	Or.-Or.-Yl. Output Grid
108	330KΩ	½	39373-84	BTS-330K	Or.-Or.-Yl. " "
109	6800Ω	½	39373-51	BTS-6800	Blue-Gray-Red " "
110	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Parasitic Suppressor
111	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Parasitic Suppressor
112	220Ω	2	39373-239	BW-2-220	Red-Red-Br. Output Cathode
113	1000Ω	10	39371-5	AB-1000	Br.-Blk.-Red Filter
114	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. AF Decoupling
115	68KΩ	½	39373-71	BTS-68K	Blue-Gray-Or. Tone Comp.
116	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. " "
117	220KΩ	½	39373-80	BTS-220K	Red-Red-Yl. " "

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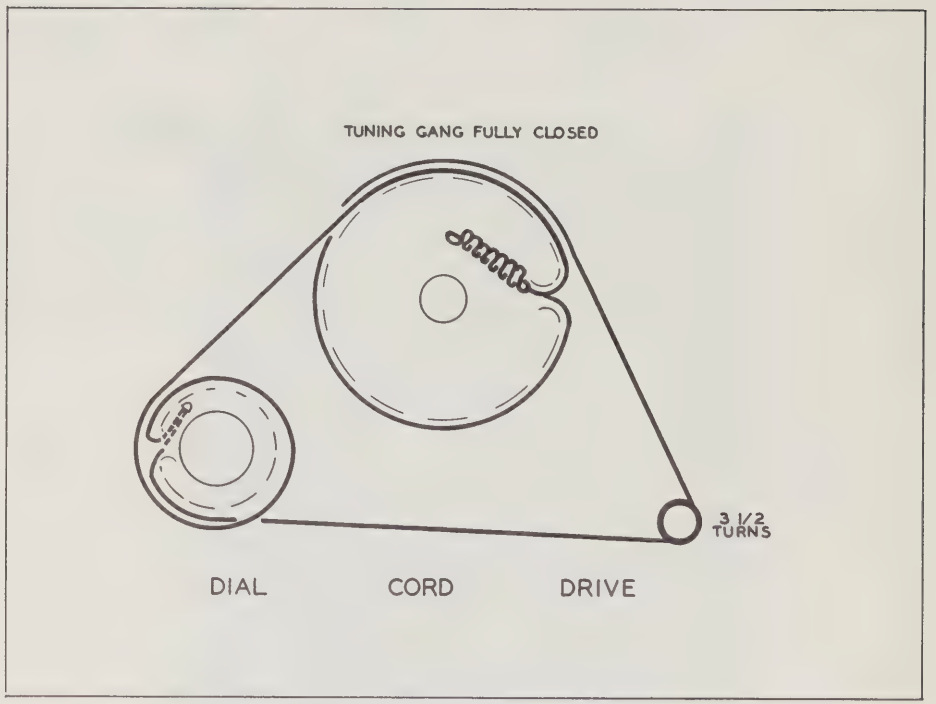
PARTS LIST AND DESCRIPTIONS (Continued)

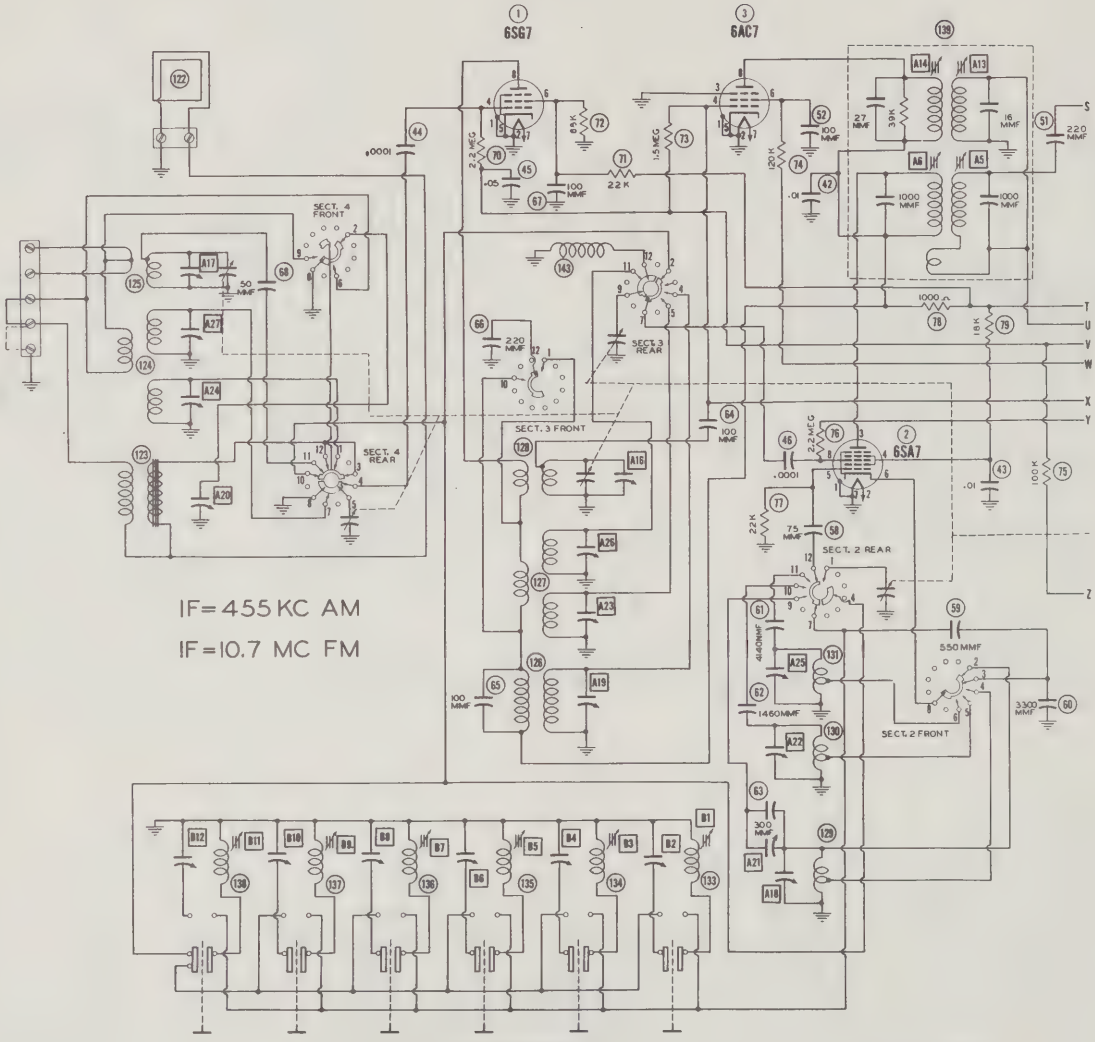
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	CROSLEY PART No.	ASTATIC PART No.	
147		L-72-A	L-72 Original Part

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
148	Switch	W-135421	On-Off
149	"	C-135976	Band
150	"	B-135870	Radio-Phono
151	"	W-135741	PB Tone Assby.
152	"	AB-135742	PB Tuning Assby.
153	Tuning Gang	C-134895	AM (12-321MMF, 12-361MMF, 12-361MMF)
A16	Trimmer	B-136327-22	FM RF Adj.
A17	"	B-136327-29	FM Ant. Adj.
	Trimmer Strip	W-135818-2	A18, A21, A22, A25
	" "	W-135821	A19, A23, A26
	" "	W-135821	A20, A24, A27
	Dial Glass	D-136142	
	Indicator	B-135970	Disc
	Pointer	B-135857	Dial





STAGE GAIN MEASUREMENTS			
RF GRID TO CONV. GRID	8X		600K~
CONVERSION GAIN	7X	IN OUT	600KC 455KC
INPUT IF	.6X		455KC
1st IF TUBE	40X		455KC
INTER. IF	.8X		455KC
2nd IF TUBE	40X		455KC
OUTPUT IF	1X		455KC
AUDIO	40X		400~
OUTPUT	22X		400~

BAND SWITCH SHOWN IN PUSHBUTTON (MAX. COUNTER-CLOCKWISE) POSITION.

SWITCH SEQUENCE:

1. PUSHBUTTON
2. FREQ. MOD.
3. BROADCAST
4. POLICE
5. SHORTWAVE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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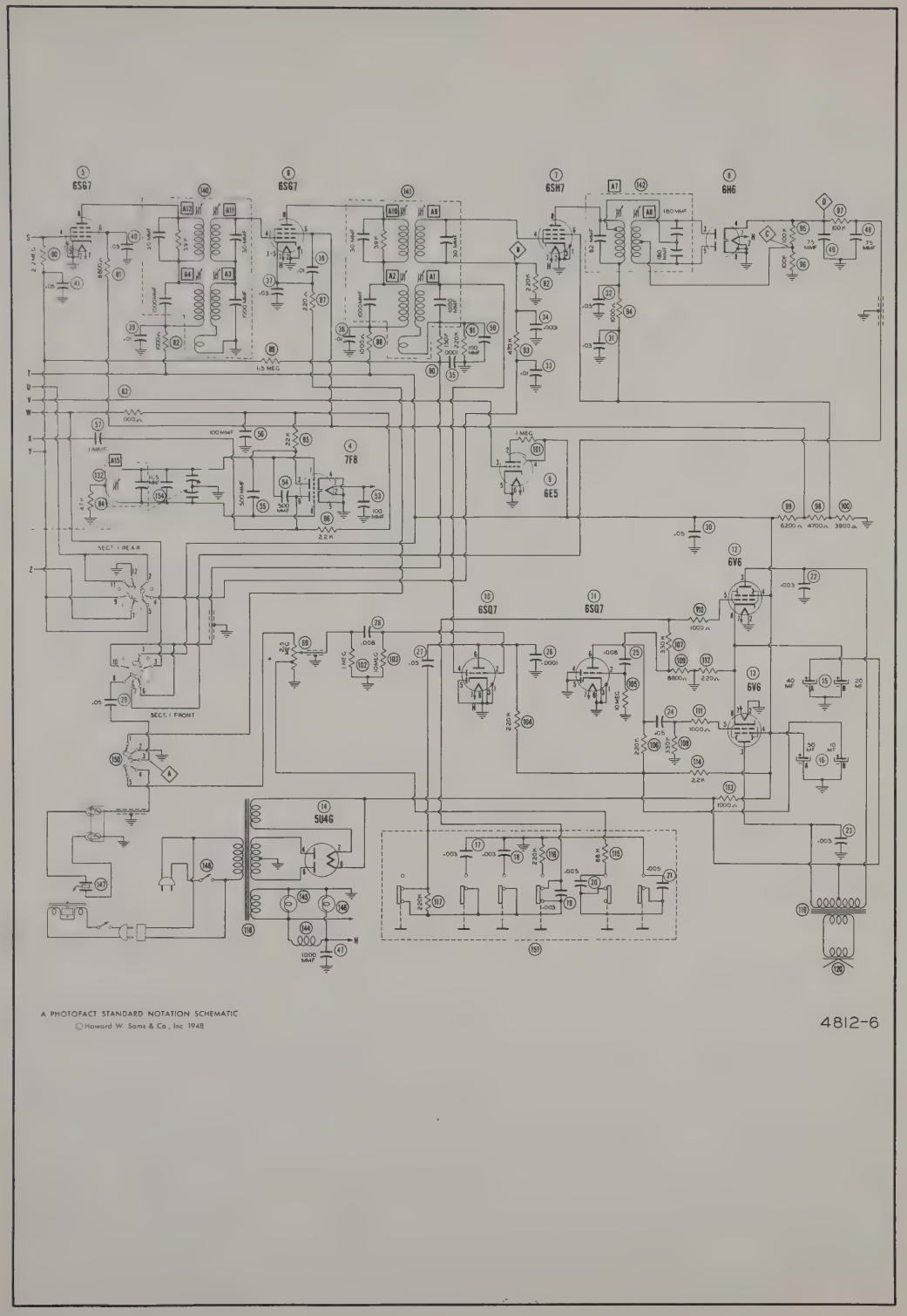
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



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VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	0V.	0V.	0V.	-.6VDC	0V.	142VDC	6.3VAC	290VDC
2	6SA7	0V.	0V.	260VDC	100VDC	-10VDC§	0V.	6.3VAC	0V.
‡ 3	6AC7	0V.	0V.	0V.	-.1VDC	0V.	85VDC	6.3VAC	257VDC
‡ 4	7F8	-4VDC	0V.	135VDC	0V.	0V.	124VDC	6.3VAC	-4VDC§
5	6SG7	0V.	0V.	0V.	-.6VDC	0V.	105VDC	6.3VAC	260VDC
6	6SG7	0V.	0V.	2VDC	0V.	2VDC	127VDC	6.2VAC	260VDC
‡ 7	6SH7	0V.	0V.	0V.	-.7VDC	0V.	50VDC	6.2VAC	50VDC
‡ 8	6H6	0V.	0V.	0V.	0V.	0V.	0V.	6.2VAC	0V.
10	6SQ7	0V.	-.6VDC	0V.	-.4VDC	0V.	120VDC	6.2VAC	0V.
11	6SQ7	0V.	-.8VDC	0V.	0V.	0V.	120VDC	6.3VAC	0V.
12	6V6GT	0V.	0V.	340VDC	270VDC	0V.	0V.	6.3VAC	15VDC
13	6V6GT	0V.	0V.	340VDC	270VDC	0V.	0V.	6.3VAC	15VDC
14	5U4G	0V.	350VDC	0V.	320VAC	6.3VAC	320VAC	0V.	350VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SG7	0Ω	0Ω	0Ω	4 Meg.	0Ω	22KΩ	.05Ω	13KΩ
2	6SA7	0Ω	0Ω	13KΩ	30KΩ	22KΩ	.6Ω	.05Ω	4 Meg.
‡ 3	6AC7	0Ω	0Ω	0Ω	2.2 Meg.	0Ω	130KΩ	.05Ω	13KΩ
‡ 4	7F8	47KΩ	0Ω	35KΩ	0Ω	0Ω	35KΩ	.05Ω	47KΩ
5	6SG7	0Ω	0Ω	0Ω	4 Meg.	0Ω	13KΩ	.05Ω	13KΩ
6	6SG7	0Ω	0Ω	220Ω	4Ω	220Ω	8KΩ	.15Ω	13KΩ
‡ 7	6SH7	0Ω	0Ω	0Ω	220KΩ	0Ω	3.9KΩ	.15Ω	4.9KΩ
‡ 8	6H6	0Ω	0Ω	100KΩ	200KΩ	100KΩ	110KΩ	.15Ω	0Ω
10	6SQ7	0Ω	10 Meg.	0Ω	220KΩ	0Ω	230KΩ	.15Ω	0Ω
11	6SQ7	0Ω	10 Meg.	0Ω	0Ω	0Ω	230KΩ	.05Ω	0Ω
12	6V6GT	INF.	0Ω	12KΩ	13KΩ	330KΩ	330KΩ	.05Ω	220Ω
13	6V6GT	INF.	0Ω	12KΩ	13KΩ	330KΩ	330KΩ	.05Ω	220Ω
14	5U4G	INF.	12KΩ	INF.	65Ω	.05Ω	67Ω	INF.	12KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

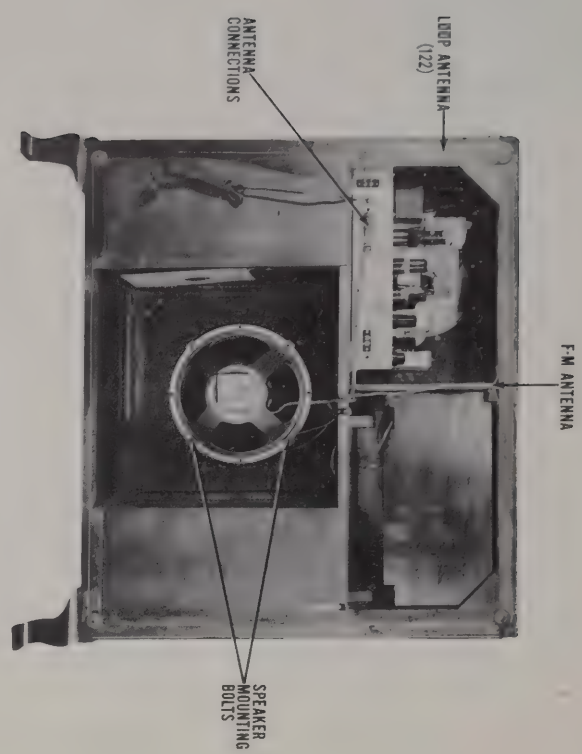
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIG. 1

FIG. 2

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop antenna leads from terminal strip at rear of chassis.
3. Remove FM dipole from terminal strip at rear of chassis.
4. Disconnect phono-motor plug.
5. Remove phono-pickup leads from terminal strip at rear of chassis.
6. Remove speaker leads from speaker.
7. Remove four hex head bolts holding chassis in cabinet. Remove chassis from cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



DATE 7/40-#4912-6 SET #42-FOLDER #6

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Loop should remain connected at all times. If chassis is removed from cabinet connect a dummy antenna, consisting of an 18.2 microhenry coil in parallel with 68MMFD cap. across signal webb terminals.

Use an insulated alignment screwdriver for all adjustments.

Release all tone control buttons to the out position.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (6). Low side to chassis.	455KC	AM	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output
2	.1 MFD.	High side to Pin 4 (grid) of 6SG7 1st IF Tube (5). Low side to chassis.	"	"	"	"	A3,A4	" " " "
3	.1 MFD.	High side to large stator of center section of tuning cap. Low side to chassis.	"	"	"	"	A5,A6	Adjust for maximum output. Repeat adjustments A1 through A6 until no further improvement can be made.

FM ALIGNMENT USING FM SIGNAL GENERATOR, OSCILLOSCOPE & OUTPUT METER

In Steps 4, 5 & 6 use freq. modulated signal with 60 ∿ modulation and 500KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection. In Steps 7 & 8 use 400∿ modulation with 45KC sweep.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4	100MMFD	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (6). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point ◈. Ground to chassis.	A7,A8.	Alternately adjust A7 for maximum amplitude and A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Peaks should be 150 to 200KC apart.
5	100MMFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (5). Low side to chassis.	"	"	"	Vertical input to Point ◈. Ground to chassis.	A9,A10 A11, A12.	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	100MMFD	High side to small stator of center section of tuning cap. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Repeat Steps 5 & 6 until no further improvement can be made.
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7	2-37.5Ω carbon res.	Each side in series with 37.5 Ω across terminals A1 & A2 of ant. terminal strip.	98MC (Freq. Mod. 45KC sweep)	FM	98MC	Across voice coil	A15	Adjust for maximum output
8	"	"	106MC	"	Tune for maximum output.	"	A16,A17	Rock tuning cap. and adjust for maximum output.

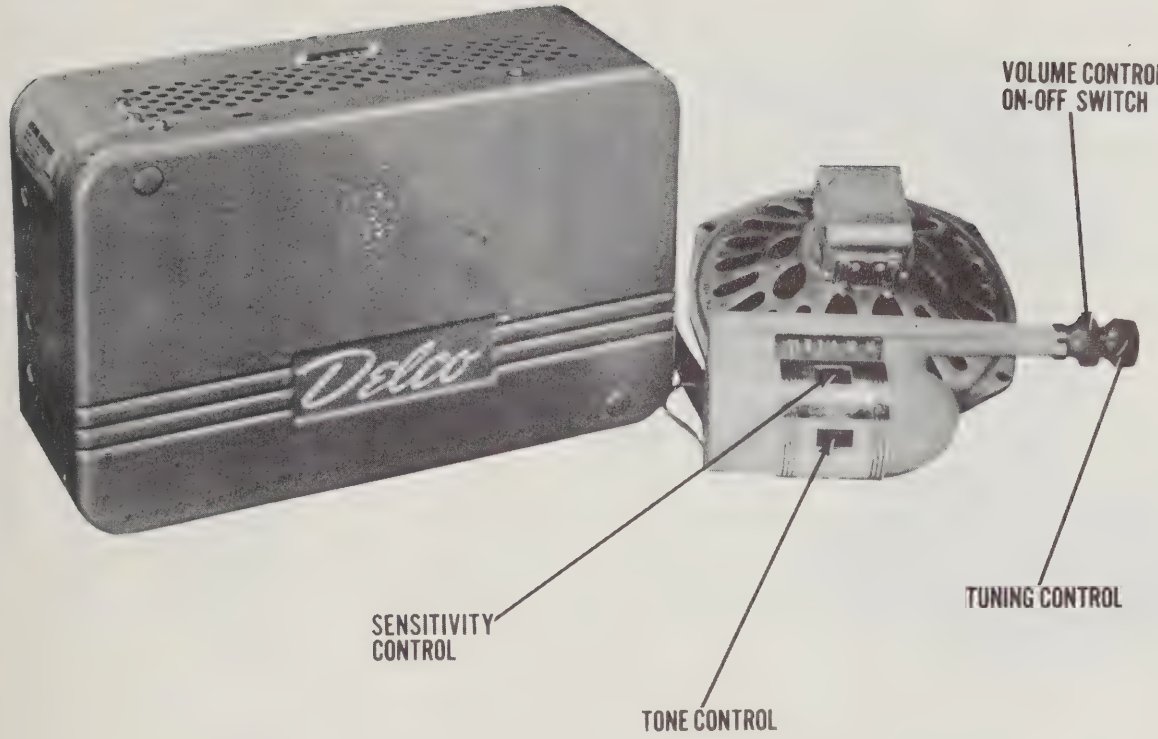
FM ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	100MMFD	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (6). Low side to chassis.	10.7MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point ◈. Common to chassis.	A9, A10	Adjust for maximum deflection.
5	100MMFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (5). Low side to chassis.	"	"	"	"	A11, A12	"
6	100MMFD	High side to small stator of center section of tuning cap. Low side to chassis.	"	"	"	"	A13, A14	"
7	100MMFD	High side to Pin 4 (grid) of 6SH7 3rd IF Tube (7). Low side to chassis.	"	"	"	DC probe to Point ◈. Common to chassis	A7	"
8	100MMFD	"	"	"	"	DC probe to Point ◈. Common to chassis	A8	Adjust for zero deflection.
						OUTPUT METER		
9	2-37.5Ω carbon res.	Each side in series with 37.5 Ω across terminals A1 & A2 of ant. terminal strip.	98MC	"	98MC	Across voice coil	A15	Adjust for maximum deflection.
10	"	"	106MC	"	Tune for maximum output.	"	A16, A17	Rock tuning cap. and adjust for maximum output.

AM RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
11	200MMFD	High side to terminal A1 on antenna terminal strip. Low side to chassis. (Link connected for ext. ant. use).	1400KC	AM	1400KC	Across voice coil	A18	Adjust for maximum output
12	200MMFD	"	"	"	Tune for maximum output.	"	A19, A20	" " " "
13	200MMFD	"	600KC	"	600KC	"	A21	Rock tuning cap. and adjust for maximum output. Repeat Steps 11, 12 & 13 until no further improvement can be made.
14	400Ω carbon res.	"	6MC	Police	6MC	"	A22	Adjust for maximum output.
15	"	"	"	"	Tune for maximum output.	"	A23, A24	" " " "
16	"	"	18MC	SW	18MC	"	A25	Adjust for maximum output. Tune sig. gen. to 18.91 MC and check for image. If signal is not heard retune sig. gen. to 18MC and open A25 to next peak. Adjust for maximum output and recheck for image.
17	"	"	"	"	Tune for maximum output.	"	A26, A27	Rock tuning cap. and adjust for maximum output.



DELCO MODEL
R-705

DELCO MODEL
R-705

DELCO MODEL R-705

TRADE NAME	Delco, Model R-705
SUPPLIER	United Motors Service Div. of G.M.C., General Motors Bldg., Detroit 2, Mich.
TYPE SET	Battery Operated Universal Automotive Superhet. Receiver with Electronic Tuning
TUBES (EIGHT)	Types, 6SG7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7GT Det.-AVC-Phase Inv., 6SQ7GT AF Amp., (2) 6V6GT Power Output, 6SN7GT DC Amp.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	550-1600KC RATING 8.4 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

In Step 2 below, A1 should be adjusted as follows: with sensitivity control (38) all the way to the left adjust A1 so that the signal strength necessary to stop the tuner will be the same when approaching the signal from either end of the band. Adjusting A1 counter-clockwise will increase tuner sensitivity when decreasing frequency.

Volume control should be at maximum position, tone control in treble position, and output of signal generator no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	260KC	High freq. end of dial.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	.1 MFD.	"	1000KC			A1	Adjust per prealignment instructions.
3	68MMFD.	High side to ant. receptacle. Low side to chassis.	1615KC	Tuning cores fully out.	"	A5,A6, A7	Check setting of core of osc. coil (86). End of core should be 1" from end of coil form. Then adjust A5, A6 and A7 for maximum output.
4	68MMFD.	"	1430KC	Tune for maximum output.	"	A8,A9	Adjust for maximum output.
5	68MMFD.	"	1615KC	Tuning cores fully out.	"	A6,A7	" " " "
6	68MMFD.	"	1430KC	Tune for maximum output.	"	A8,A9	" " " "

When adjustments have been completed, reinstall receiver in car. With antenna extended, tune in weak station near 1400KC and adjust A7 for maximum volume.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		DELCO PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6SG7	6SG7	8BK	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC & Phase Inv.	6SQ7GT	6SQ7GT	8Q	
5	AF Amp.	6SQ7GT	6SQ7GT	8Q	
6	Power Output	6V6GT	6V6GT	7AC	
7	" "	6V6GT	6V6GT	7AC	
8	DC Amp.	6SN7GT	6SN7GT	8BD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
9A	20	400	7241198		UP222450*	DY-418*	EL-442*	◓ Filter
B	20	400						■ "
C	20	25						▲ Cathode Bypass
10	40	25	J500	PRS25/50	BR502	M-50-25	TA-50	" "
11	.005	3000	7257451	1684-005	MD16D5	STM-16-005	TR-25	Buffer
12	.5	100	E504	484-.5	DT2P5	SHH-1	TC-5	Hash Filter
13	.5	100	E504	484-.5	DT2P5	SHH-1	TC-5	" "
14	.5	200	E504	484-.5	DT2P5	SHH-1	TC-5	" "
15	.5	100	E504	484-.5	DT2P5	SHH-1	TC-5	" "
16	.005	400	E502	484-005	DT6D5	ST-6-005	TC-25	Tone Comp.
17	.005	1000	H502	1084-005	MD16D5	STM-16-005	TR-25	Output Plate Bypass
18	.05	400	E503	484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
19	.05	400	E503	484-05	DT4S5	ST-4-05	TC-15	" "
20	.005	600	E502	684-005	DT6D5	ST-6-005	TC-25	" "
21	.005	600	E502	684-005	DT6D5	ST-6-005	TC-25	" "
22	.02	200	E203	484-02	DT2S2	ST-4-02	TC-12	AVC Filter
23	.05	400	E503	484-05	DT4S5	ST-4-05	TC-15	Decoupling
24	.1	400	E104	484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
25	470	500	G471	1468-0005	5W5T5	MO.5-35	1FM-35	DC Amp. Grid Filter
26	100	500	G101	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
27	100	500	G101	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
28	100	500	G101	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
29	47	500	G470	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling
30	240	300	7256349					Compensating Cap.-Cer.
31	33	500	G330					Fixed Trimmer
32	470	500	G471	1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling
33	330	500	G331	1468-0003	5W5T3	MO.5-33	1FM-33	Ant. Coupling
34	470	500	G471	1468-0005	5W5T5	MO.5-35	1FM-35	Muting Bias Filter
35	470	500	G471	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass Pwr. Supply

*Omit one section.

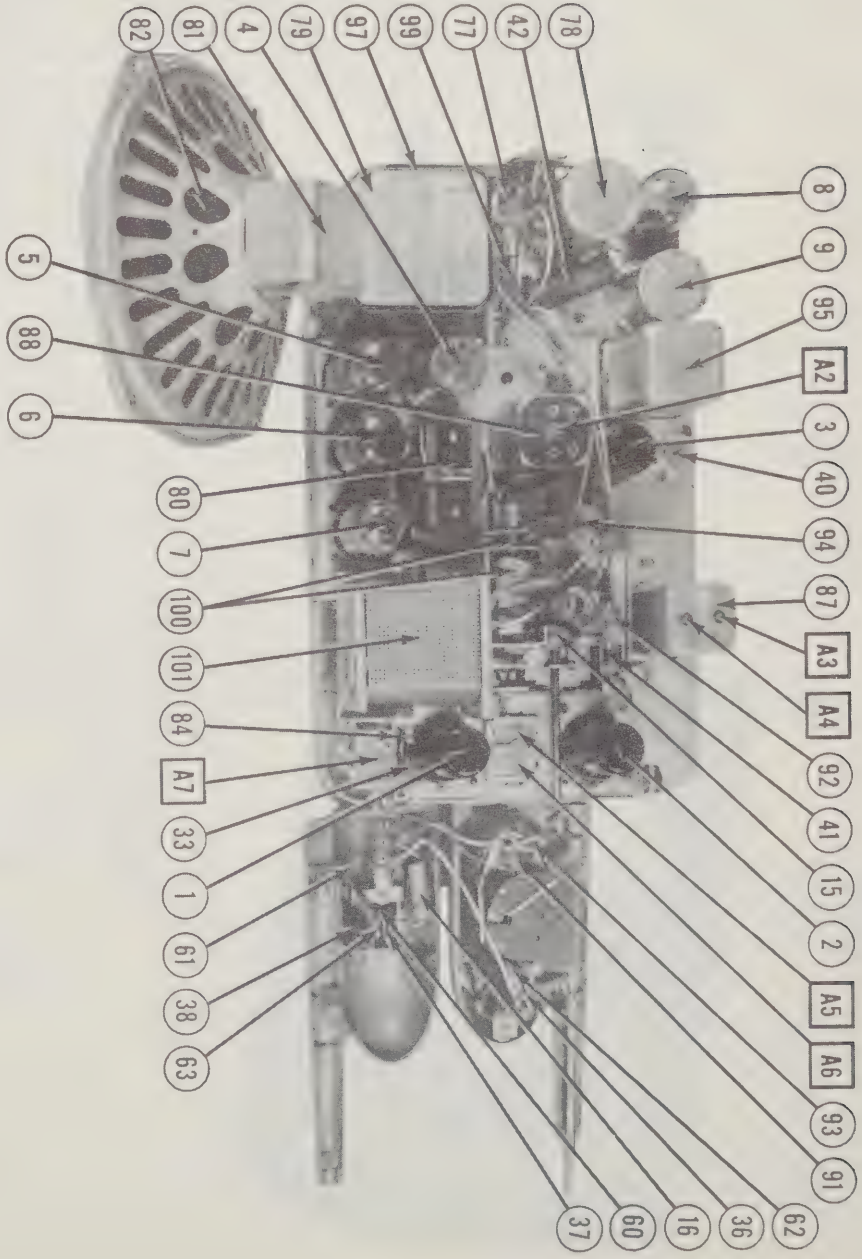
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	IRC PART No.	CLAROSTAT PART No.	
36	1 Meg.	½	7256085			Volume Control & Sw. tapped @ 250KΩ
37	1 Meg.	½	7256425			Tone Control
38	4000Ω	½	7256424			Tuner Sensitivity Control
39A	1 Meg.	½	7256287	D11-137	M-61-S	Tuner Sensitivity Control (Preset) .
B	Shaft		Not Req.	A	Not Req.	Attach to 39A per instructions
40	2000Ω	½	7242204			Radio Sensitivity Control (Preset)
41A	30Ω	1	7256317			Dial Pointer Rheostat
B	Arm		7255811			Rheostat Arm. Attach to 41A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DELCO PART No.	IRC PART No.	
42	100Ω	½	A-101	BW-½-100	Br.-Blk.-Br. RF Cathode
43	15KΩ	2	C-153	BT-2-15K	Br.-Grn.-Or. Screen Dropping
44	10KΩ	½	B-103	BTS-10K	Br.-Blk.-Or. RF Plate Load
45	2.2 Meg.	½	A-225	BTS-2.2 Meg.	Red-Red-Grn. RF Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DELCO PART No.	IRC PART No.	
46	330KΩ	½	A-334	BTS-330K	Or.-Or.-Yl. Conv. Grid
47	1 Meg.	½	A-105	BTS-1 Meg.	Br.-Blk.-Grn. Muting Bias Network
48	22KΩ	½	A-223	BTS-22K	Red-Red-Or. Oscillator Grid
49	4700Ω	½	A-472	BTS-4700	Yl.-Vi.-Red Decoupling
50	1 Meg.	½	A-105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
51	1 Meg.	½	A-105	BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
52	15 Meg.	½	A-156	BTS-15 Meg.	Br.-Grn.-Blue Bias
53	6.8 Meg.	½	A-685	BTS-6.8 Meg.	Blue-Gray-Grn. 1st AF Grid
54	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. 1st AF Plate Load
55	10Ω	½	A-100	BW-½-10	Br.-Blk.-Blk. 1st AF Cathode
56	150Ω	½	A-151	BW-½-150	Br.-Grn.-Br. Feedback
57	6.8 Meg.	½	A-685	BTS-6.8 Meg.	Blue-Gray-Grn. Phase Inverter Grid
58	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. Phase Inverter Plate Load
59	120KΩ	½	A-124	BTS-120K	Br.-Red-Yl. Bias
60	3300Ω	½	A-332	BTS-3300	Or.-Or.-Red "
61	2200Ω	½	A-222	BTS-2200	Red-Red-Red "
62	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. Tone Comp.
63	3900Ω	½	A-392	BTS-3900	Or.-White-Red Sensitivity Control Shunt
64	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. Output Grid
65	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. " "
66	100KΩ	½	A-104	BTS-100K	Br.-Blk.-Yl. " "
67	330Ω	2	C-331	BW-2-330	Or.-Or.-Br. Output Cathode
68	1 Meg.	½	A-105	BTS-1 Meg.	Br.-Blk.-Grn. Voltage Dropping
69	3.9 Meg.	½	A-395	BTS-3.9 Meg.	Or.-White-Grn. DC Amp. Plate
70	1 Meg.	½	A-105	BTS-1 Meg.	Br.-Blk.-Grn. DC Amp. Grid
71	220KΩ	½	A-224	BTS-220K	Red-Red-Yl. " " "
72	47KΩ	½	B-473	BTS-47K	Yl.-Vi.-Or. Voltage Dropping-See Note
73	4700Ω	2	C-472	BT-2-4700	Yl.-Vi.-Red DC Amp. Cathode
74	4700Ω	2	C-472	BT-2-4700	Yl.-Vi.-Red Filter
75	4700Ω	2	C-472	BT-2-4700	Yl.-Vi.-Red "
76	4700Ω	1	B-472	BTA-4700	Yl.-Vi.-Red Hash Suppressor
77	220Ω	½	A-221	BW-½-220	Red-Red-Br. Parasitic Suppressor

Note-Some models use a 56KΩ 1 Watt paralleled by a 220KΩ ½ Watt in this application.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				DELCO PART No.	RADIART PART No.	
78	Synchronous	6.2 VDC	115∿	7255853	5406	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	DELCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
79	6.3VDC @ 4.5A	580VAC .078A DC			7256293			

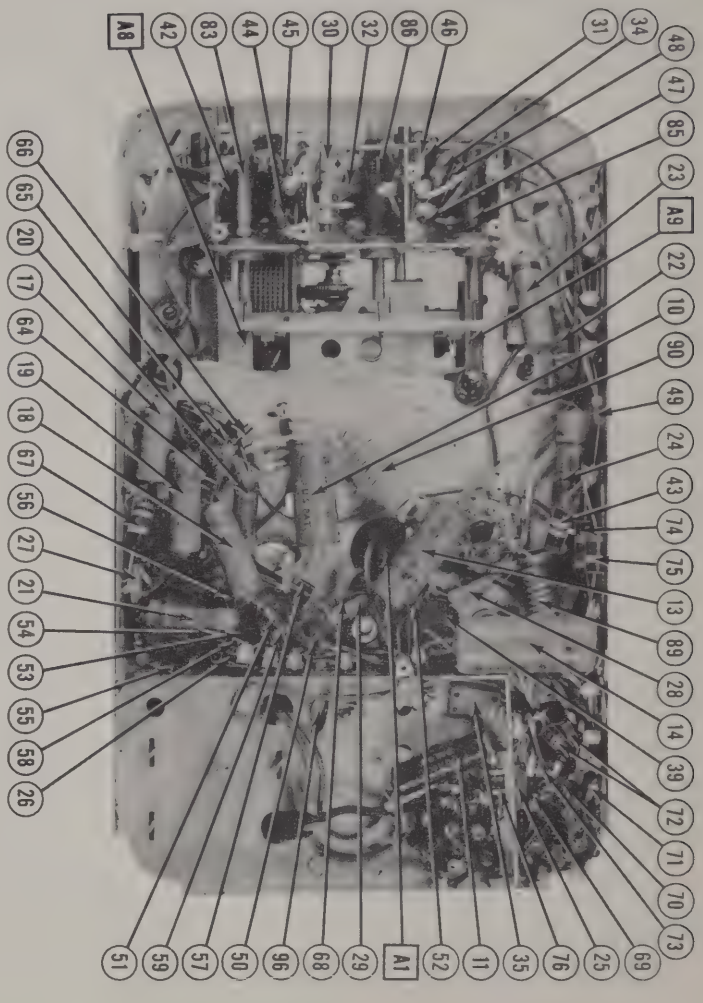
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DELCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
80	13KΩ CT	3.6Ω	410Ω CT	.4Ω	7256628	A-3623†	T22S47†	A-2901†	†Cut mounting tabs to duplicate original.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DELCO PART No.	JENSEN PART No.	QUAM PART No.	
81	FIELD PM	VC IMP. 3.6Ω	7255955		7A31	
82	CONE DIA. 6-7/8"	VC DIA. 3/4"				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DELCO PART No.	MEISSNER PART No.	
83	Ant.Coil		12.5Ω	7256246		
84	RF Grid Coil		7Ω	7240251		
85	RF Coil		7Ω	7256246		
86	Osc. Coil	1Ω	4Ω	7256244		
87	Input IF	41Ω	41Ω	7256218		
88	Output IF	49Ω		7256371		
89	RF Choke		0Ω	7241708		
90	RF Choke		0Ω	7241708		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					DELCO PART No.		
91	Bayonet	6-8	0.25	Blue	187189		Type 44

MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
92	Switch	7256284	Motor Reversing
93	"	7256086	Tuner and Interlock
94	"	1217947	Motor and Disabling
95	Relay	7256216	SPDT
96	Spark Plate	1217946	
97	" "	1217843	
98	Fuse	120114	30 Amp.
99	"	120151	15 Amp.
100A	Solenoid	7256021	
B	Core	7255791	
101	Motor Assby.	7256429	
A5, A6	Trimmer Strip	7242454	Osc. Adj. / RF Adj.
A7	Trimmer	7256093	Ant. Adj.
	Dial Ind. Unit	1517002	
	Dial Glass	7256054	

Vibrator Polarity

All makes or models of cars do not have the same battery polarity. It is necessary to position the vibrator according to the battery polarity of the car in which the radio will be installed. This is very important. Incorrect polarity of the vibrator may result in damage to the radio. Determine which battery terminal is connected to the chassis in the car, remove the cover of the radio and position the vibrator as shown in figure 1.

On cars with negative battery ground insert vibrator with — mark toward arrow.

On cars with positive battery ground insert vibrator with -|- mark toward arrow.

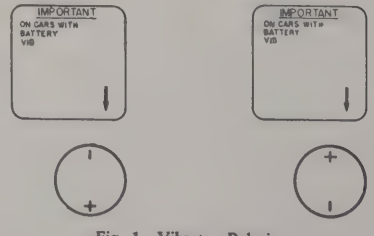


Fig. 1 Vibrator Polarity

VOLTAGE AND RESISTANCE READINGS TAKEN WITH TUNER SENSITIVITY CONTROL (40) AT MINIMUM SENSITIVITY.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SQ7	0V.	6.2VDC	.4VDC	-.2VDC	.4VDC	75VDC	0V.	150VDC
2	6SA7	0V.	0V.	138VDC	75VDC	-9.6VDC§	0V.	6.2VDC	0V.
3	6SK7	0V.	6.2VDC	0V.	0V.	.8VDC	75VDC	0V.	217VDC
4	6SQ7GT	0V.	.4VDC	17VDC	0V.	5.5VDC	112VDC	6.2VDC	0V.
5	6SQ7GT	0V.	-.8VDC	0V.	0V.	0V.	100VDC	0V.	6.2VDC
6	6V6GT	0V.	0V.	250VDC	208VDC	0V.	0V.	6.2VDC	14VDC
7	6V6GT	0V.	0V.	250VDC	208VDC	0V.	0V.	6.2VDC	14VDC
8	6SN7GT	2.5VDC	.4VDC	9VDC	70VDC	220VDC	87VDC	6.2VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

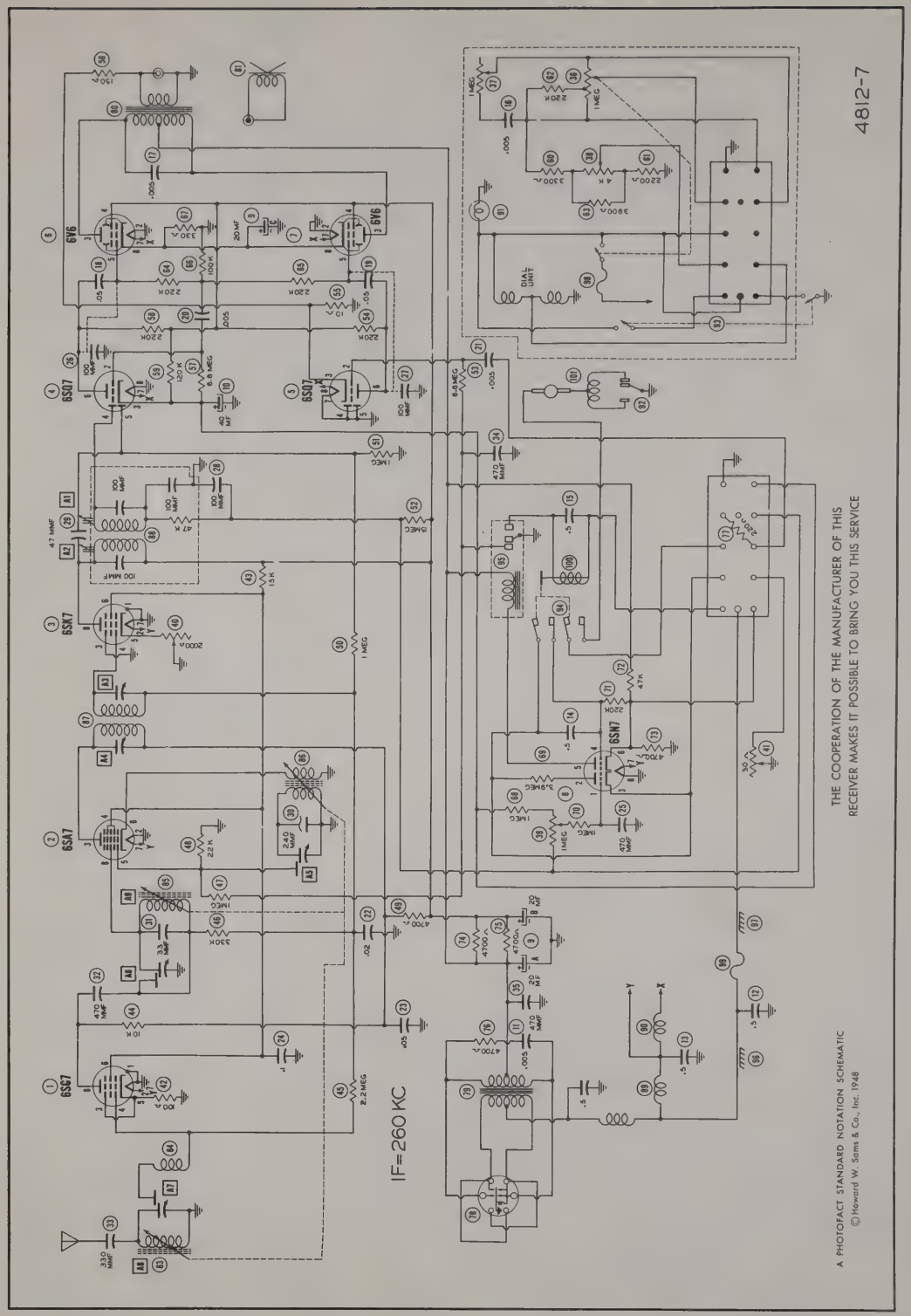
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SQ7	0Ω	.1Ω	100Ω	4.2 Meg.	100Ω	45KΩ	0Ω	45KΩ
2	6SA7	0Ω	0Ω	35KΩ	45KΩ	22KΩ	1Ω	.1Ω	2.3 Meg.
3	6SK7	0Ω	.1Ω	0Ω	2 Meg.	2KΩ	45KΩ	0Ω	30KΩ
4	6SQ7GT	0Ω	7 Meg.	7KΩ	1 Meg.	600KΩ	250KΩ	.1Ω	0Ω
5	6SQ7GT	0Ω	7 Meg.	10Ω	0Ω	0Ω	250KΩ	0Ω	.1Ω
6	6V6GT	0Ω	0Ω	30KΩ	30KΩ	320KΩ	.2Ω	.1Ω	330Ω
7	6V6GT	0Ω	0Ω	30KΩ	30KΩ	320KΩ	100KΩ	.1Ω	330Ω
8	6SN7GT	1.7 Meg.	4 Meg.	2.5KΩ	220KΩ	30KΩ	4.7KΩ	.1Ω	0Ω

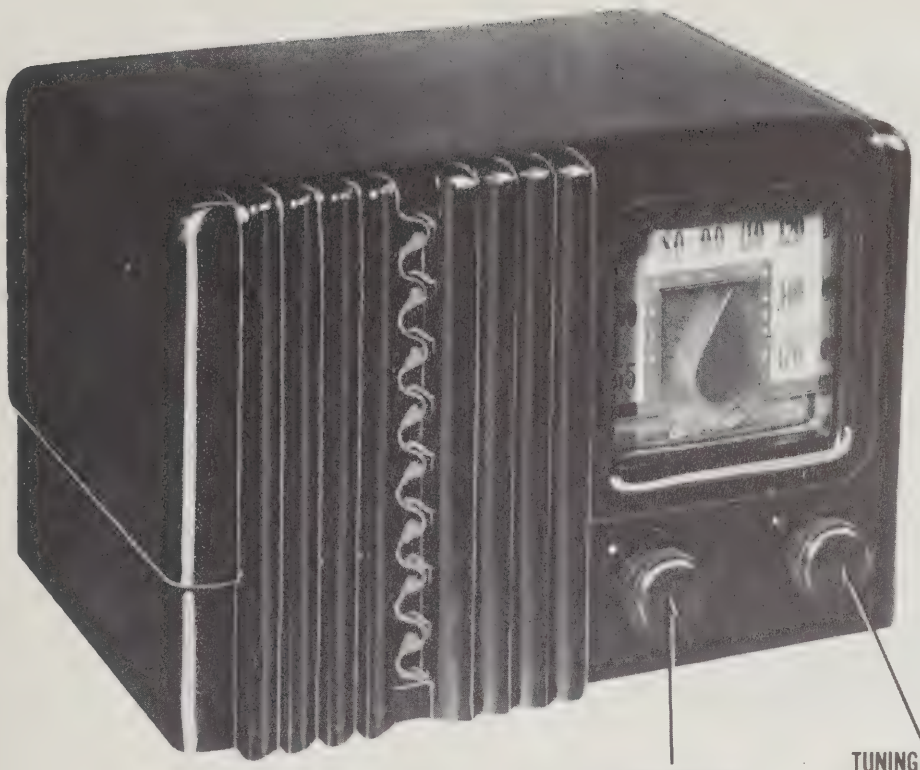
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS			
ANTENNA TO CONV. GRID	9X		600KC
CONV. GAIN	28X	IN	600KC
		OUT	260KC
INPUT IF TRANS.	.75X		260KC
IF TUBE	125X		260KC
OUTPUT IF TRANS.	.2X		260KC
AUDIO	18X		400 ∿
OUTPUT	24X		400 ∿

The stage gain measured values listed above are approximate values for an average operative stage rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute value is impractical. AVC is made inoperative by connecting (-) 3 volts to the AVC line.





DELCO MODEL
R-1233

DELCO MODEL
R-1233

DELCO MODEL R-1233

TRADE NAME	Delco, Model R-1233
SUPPLIER	United Motors Service, Div. of GMC, General Motors Bldg., Detroit 2, Mich.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	220MMFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	456KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2		Loop	1720KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 7/48-#4812-8 SET #42-FOLDER #8

PARTS LIST AND DESCRIPTIONS

DELCO MODEL R-1233

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	J908	PRSA150/40-40	BRD4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" -Blue
7	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	Rectifier Bypass
8	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
9	.005	600	E502	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.005	400	E502	484-005	DT6D5	ST-6-005	TC-25	" "
11	.05	200	E503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
12	.2	400	E204	484-.2	DT4P2	ST-4-2	72P2	Line Isolation
13	470	500	G471	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DELCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	500KΩ	½	8071	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 14A per instructions
C	Switch		8201	41	SW-A	" " " " "

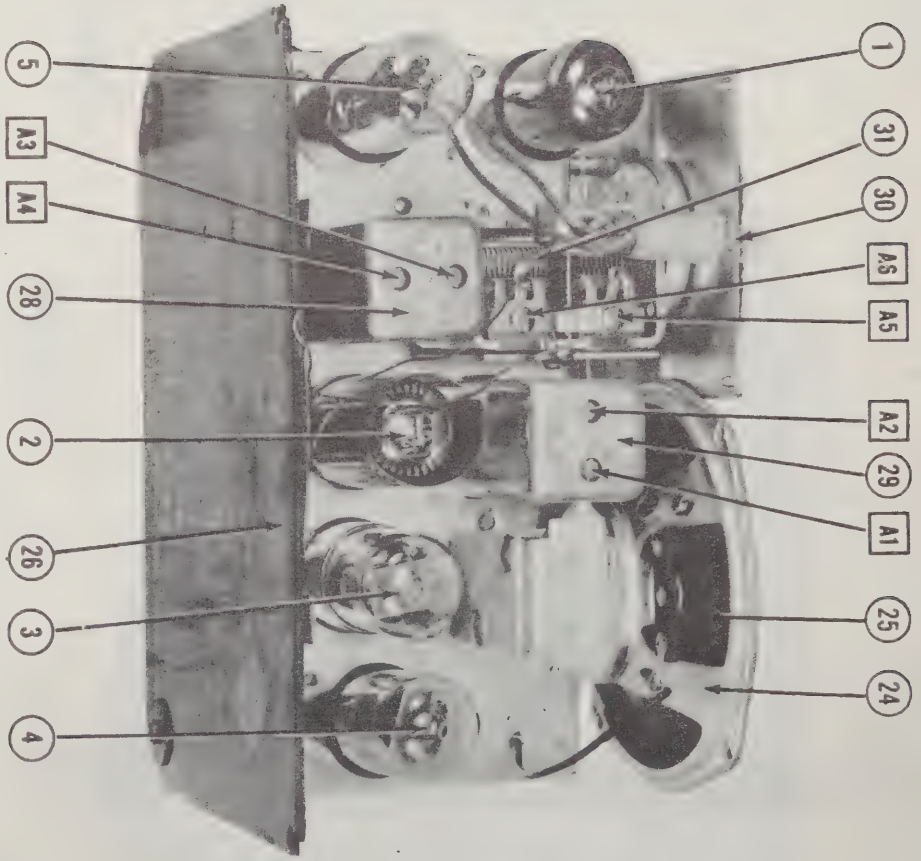
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DELCO PART No.	IRC PART No.	IDENTIFICATION CODES
15	22KΩ	½	A223	BTS-22K	Red-Red-Or. Oscillator Grid
16	3.3 Meg.	½	A335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
17	6.8 Meg.	½	A685	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
18	220KΩ	½	A224	BTS-220K	Red-Red-Yl. AF Plate Load
19	470KΩ	½	A474	BTS-470K	Yl.-Vi.-Yl. Output Grid
20	150Ω	½	A151	BW-½-150	Br.-Grn.-Br. Output Cathode
21	1000Ω	1	B102	BTA-1000	Br.-Blk.-Red Filter
22	33Ω	½	A330	BW-½-33	Or.-Or.-Blk. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DELCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
23	2500Ω	3.0Ω	210Ω	.6Ω	1216571	A-3876#	T22S45#	A-2928#	#Cut mounting tabs to duplicate original.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DELCO PART No.	JENSEN PART No.	QUAM PART No.	
24	FIELD PM	VC IMP. 3.0Ω	1216563	ST-105* Mod. P5-X	5A07*	*Drill and tap magnet frame.
25	CONE DIA. 4"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DELCO PART No.	MEISSNER PART No.	
26	Loop Ant.		1.5Ω	1218286		
27	Osc. Coil	.8Ω	6.3Ω	1216518	14-1060	Add 50MMFD from high side tuning cap. to oscillator grid.
28	Input IF	16.2Ω	16.2Ω	1217972	16-6658	
29	Output IF	16.2Ω		1217973	16-6670	

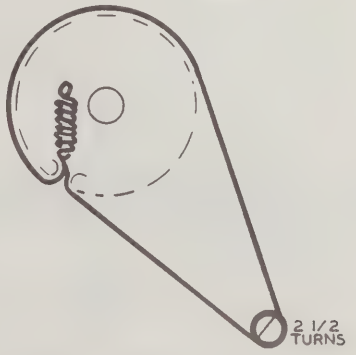
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					DELCO PART No.		
30	Bayonet	6-8	0.15	Brown	47		Type 47

MISCELLANEOUS

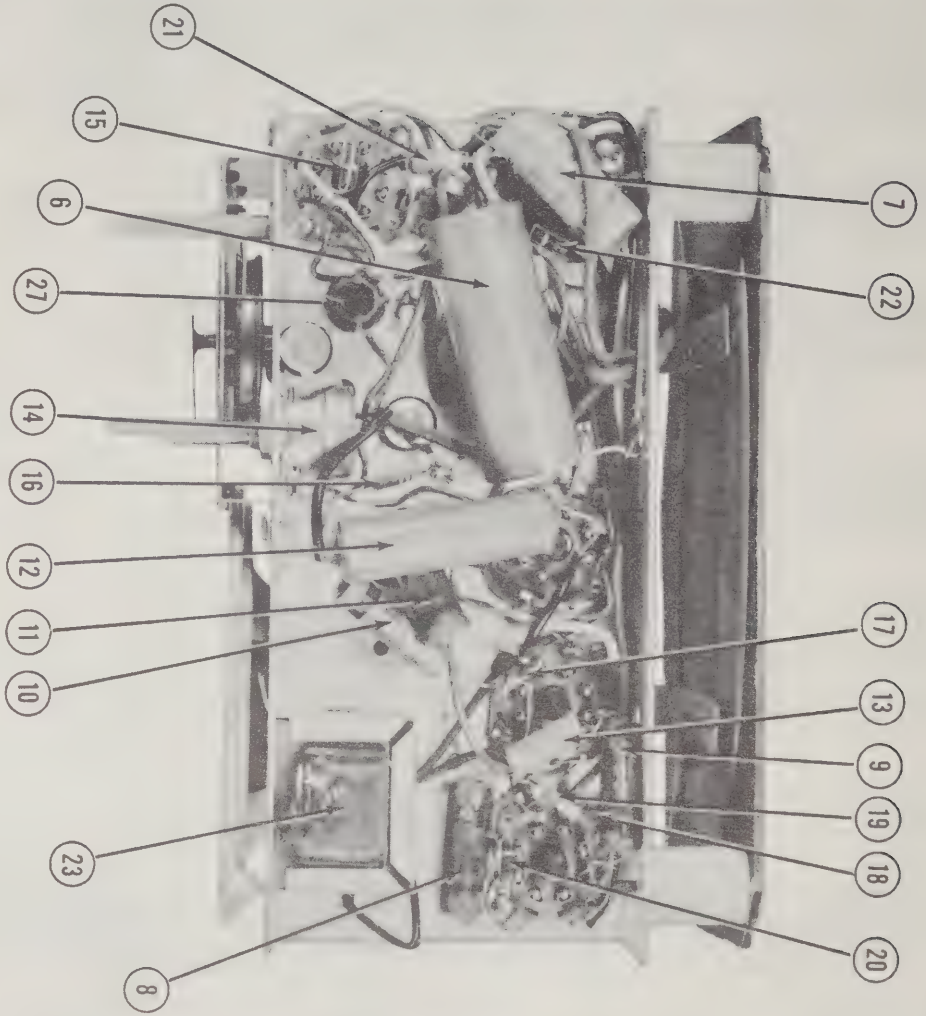
ITEM No.	PART NAME	DELCO PART No.	NOTES
31	2 Gang Var. Cap. Dial & Plate Dial Pointer Dial Glass Knob	1217391 1217421 1218253 1216660 1218254	(30-470MMF, 30-195MMF) Assembly

TUNING GANG FULLY CLOSED

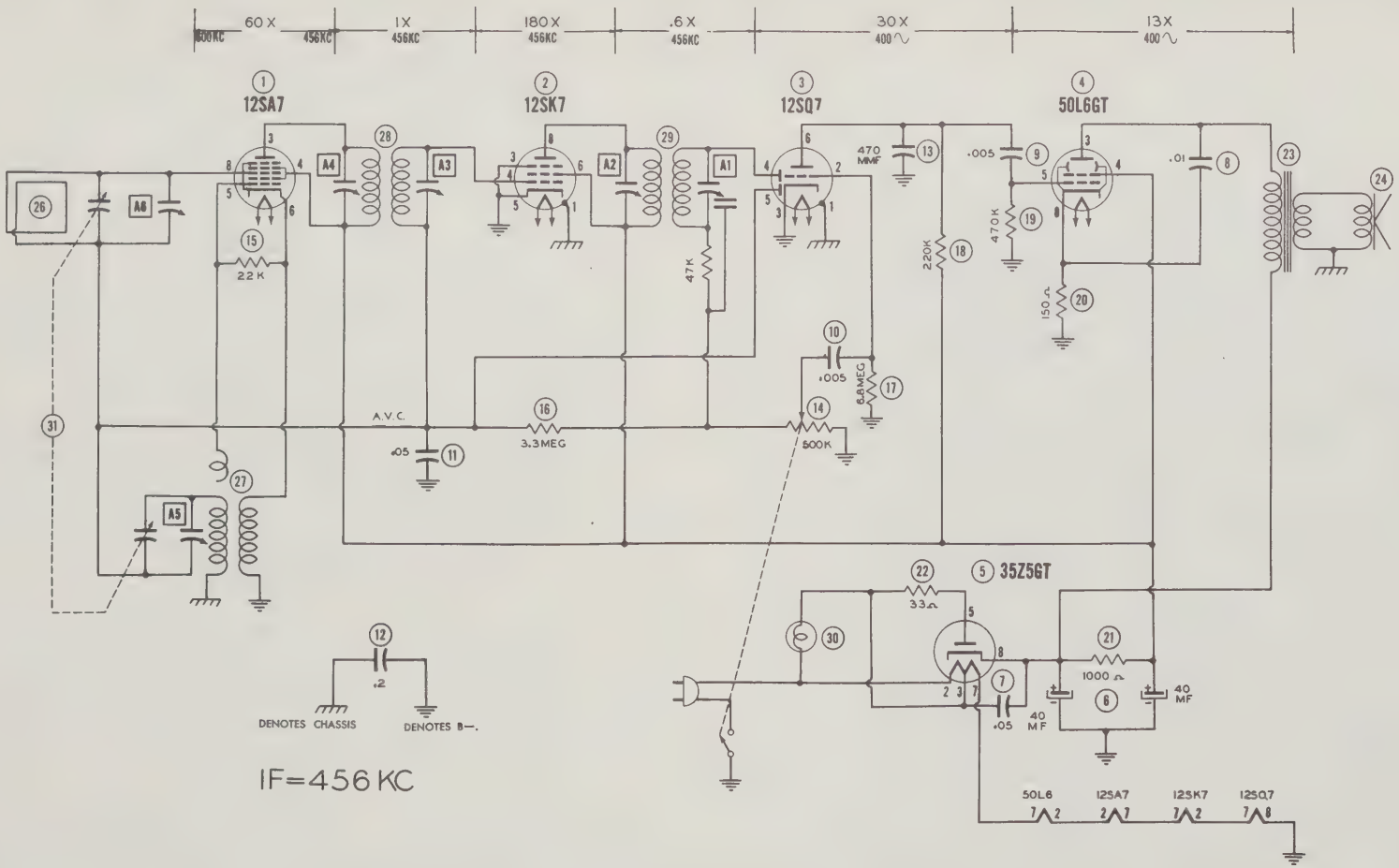


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



DELCO MODEL R-1233



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V	36VAC	90VDC	90VDC	-11VDC§	0V.	24VAC	-.4VDC
2	12SK7GT	0V.	12VAC	0V.	-.4VDC	0V.	90VDC	24VAC	90VDC
3	12SQ7GT	0V.	-.6VDC	0V.	-.5VDC	-.4VDC	62VDC	12VAC	0V.
4	50L6GT	0V.	36VAC	106VDC	90VDC	0V.	0V.	85VAC	5.9VDC
5	35Z5GT	0V.	117VAC	112VAC	0V.	108VAC	113VDC	85VAC	113VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	INF.	38Ω	80KΩ	80KΩ	22KΩ	.8Ω	25Ω	3.8 Meg.
2	12SK7GT	INF.	12Ω	0Ω	3.8 Meg.	0Ω	80KΩ	25Ω	80KΩ
3	12SQ7GT	INF.	6.8 Meg.	0Ω	550KΩ	3.8 Meg.	300KΩ	12Ω	0Ω
4	50L6GT	INF.	38Ω	80KΩ	80KΩ	470KΩ	INF.	85Ω	150Ω
5	35Z5GT	INF.	115Ω	110Ω	INF.	140Ω	80KΩ	85Ω	80KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-8

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DeWALD MODEL B-612

TRADE NAME	DeWald, Model B-612
MANUFACTURER	DeWald Radio Mfg. Corp., 35-28 49th St. Long Island City, N.Y.
TYPE SET	AC-DC Operated Wireless FM Tuner
TUBES (SIX)	Types, 12AT7 Converter, 12BA6 1st IF Amp., 12BA6 2nd IF Amp., 12AL5 Disc. Det., 12SA7 AM Osc., 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
RATING	.22 Amp. @ 117 Volts AC
TUNING RANGE	FREQ. MOD. 87-109MC
RE-BROADCAST	500 - 750KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.
Use insulated alignment screwdriver for all adjustments.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD	High side to Pin 7 (grid) of 12AT7. Low side to chassis.	10.7MC (Unmodulated)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis.	A1,A2, A3,A4, A5	Adjust for maximum deflection.
2	.01 MFD	"	"	"	DC probe to Point (B). Common to chassis.	A6	Adjust for zero deflection. Continue with FM-RF Alignment Step 3.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to pin 7 (grid) of 12AT7. Low side to chassis.	10.7MC (Freq. Modulated)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A1,A2, A3,A4, A5	Use full vertical gain of scope and attenuate output of sig. gen. to just give usable pattern. This is to prevent overloading of IF amplifiers. Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
2	.01 MFD	High side to pin 7 (grid) of 12AT7. Low side to chassis.	"	"	Vertical input to Point (C). Ground to chassis.	A6	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 3.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
3	2-150Ω carbon res.	Each side of gen. leads in series with 150Ω to ant. leads.	109MC (Unmodulated)	Tuning cap. fully open.	DC probe to Point A. Common to chassis	A7	Adjust for maximum deflection
4	"	"	105MC	Tune for maximum deflection.	"	A8	" " " "
5	"	"	90MC	"	"	A9	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.
6	"	"	90MC (Freq. Mod. with 400∿ modulation)	"		A10	Tune auxiliary receiver to approximately 540KC (Point of non-interference). Adjust A10 for maximum output from the auxiliary receiver.

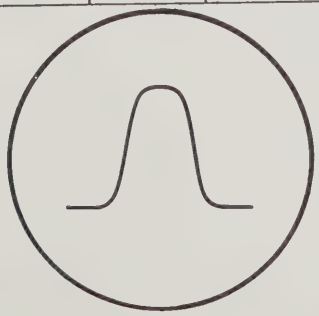

FIG. 1

FIG. 2

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PARTS LIST AND DESCRIPTIONS

DeWALD MODEL B-612

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DeWALD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12AT7	12AT7		
2	1st IF Amp.	12BA6	12BA6	7BK	
3	2nd IF Amp.	12BA6	12BA6	7BK	
4	Disc. Det.	12AL5	12AL5	6BT	
5	AM Osc.	12SA7	12SA7	8R	
6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

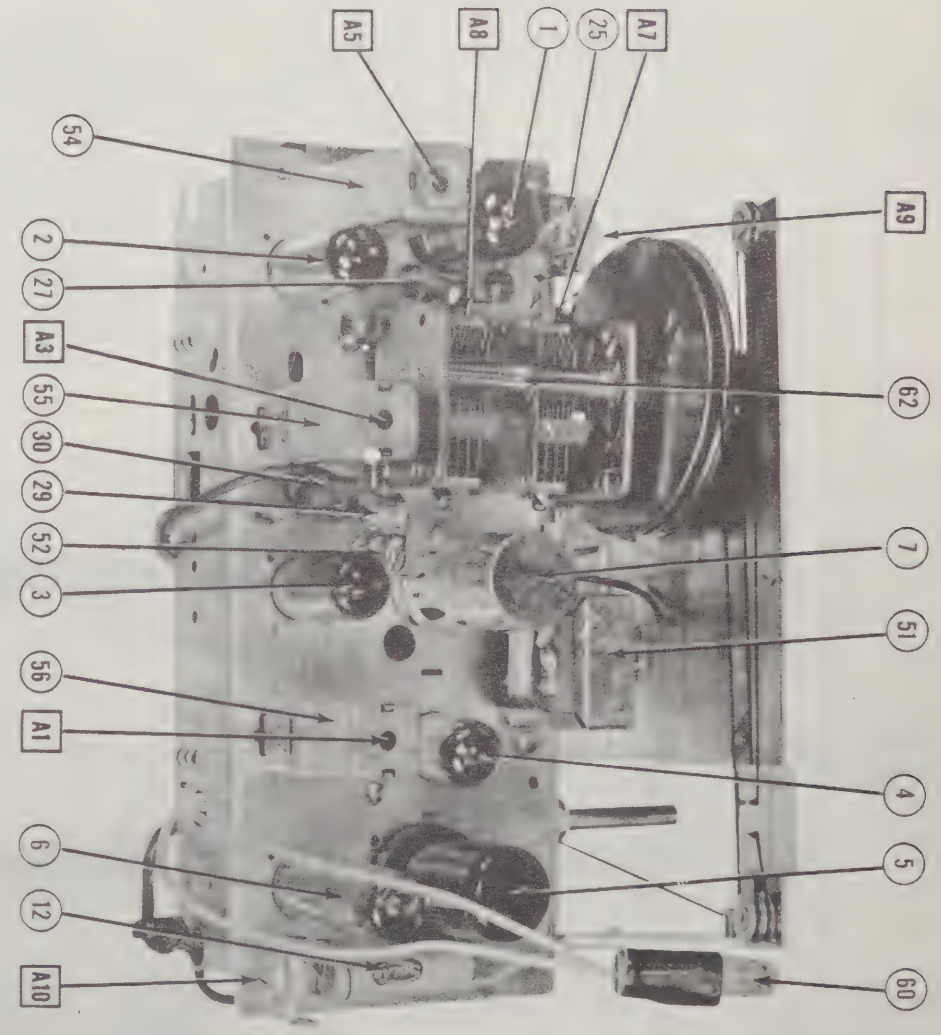
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DeWald PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	150	2018	AF66D	UP3315	DY-2x30-150	EL-230	▲ Filter
B	30	150						■ "
8	20	150		PRS150-20	BR2015	M-20-150	UT-201	"
9	10	25		PRS25-10	BR102A	M-10-25	TA-10	Cathode Bypass
10	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
11	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
12	.05	400		484-05	DT4S5	ST-4-05	TC-15	Screen Bypass
13	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	Filament Bypass-Cer.
14	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	" " "
15	220	300		1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.-Cer.
16	220	300		1468-00025	5W5T25	MO.5-325	1FM-325	Ant. Coupling-Cer.
17	220	300		1468-00025	5W5T25	MO.5-325	1FM-325	De-emphasis-Cer.
18	47	300		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass-Cer.
19	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Decoupling-Cer.
20	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Grid Filter-Cer.
21	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	1st IF Decoupling-Cer.
22	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	AVC Filter-Cer.
23	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass Pwr. Supply-Cer.
24	47	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
25	33	300						Fixed Pad-Cer.
26	2	300						Osc. Coupling-Cer.
27	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	RF Coupling-Cer.
28	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	Conv. Cathod Bypass-Cer.
29	2.5	300						Ant. Coupling-Cer.
30	220	300		1468-00025	5W5T25	MO.5-325	1FM-325	" " "
31	47	300		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
32	1500	300		1467-0015	1W5D15	MW.5-215	1FM-215	Filament Bypass

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DeWALD PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
33	10KΩ	½		BTS-10K	Br.-Blk.-Or. FM Oscillator Grid
34	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. FM Converter Grid-See Note
35	2200Ω	½		BTS-2200	Red-Red-Red FM Converter Cathode-See Note
36	220KΩ	½		BTS-220K	Red-Red-Yl. AVC Network
37	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st IF Decoupling
38	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Limiter Grid
39	1000Ω	½		BTS-1000	Br.-Blk.-Red Limiter Decoupling
40	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
41	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
42	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
43	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Oscillator Injection Grid
44	330Ω	½		BW-½-330	Or.-Or.-Br. Oscillator Cathode
45	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
46	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Screen Dropping
47	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Plate Load
48	680Ω	2		BT-2-680	Blue-Gray-Br. Filter
49	18Ω	½		BW-½-18	Br.-Gray-Blk. Rectifier Ballast
50	150Ω	4		AB-150	Br.-Grn.-Br. Line Dropping

Note-Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000∿)	DeWALD PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
51	.046A	200Ω	5 Henries	1042	C-1706*	T20C53*	C-2977*	*Drill one new mounting hole.

R F COILS

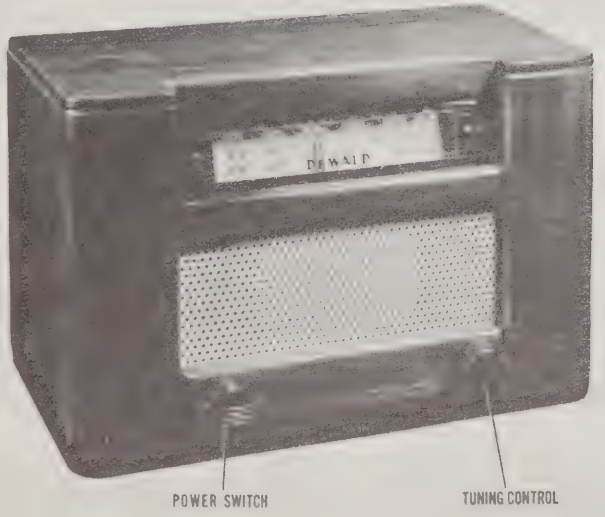
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DeWALD PART No.	MEISSNER PART No.	
52	Ant. Coil		0Ω	1043		
53	FM Osc.Coil		0Ω	1044		
54	1st IF	.4Ω	.4Ω	1038-1		
55	2nd IF	.4Ω	.4Ω	1038-1		
56	Disc. Trans.	.4Ω	.7Ω	1038-2		
57	AM Osc.Coil		5.3Ω	1041		
58	Line Choke		.1Ω	1040-2		
59	" "		.1Ω	1040-2		

DIAL LIGHT

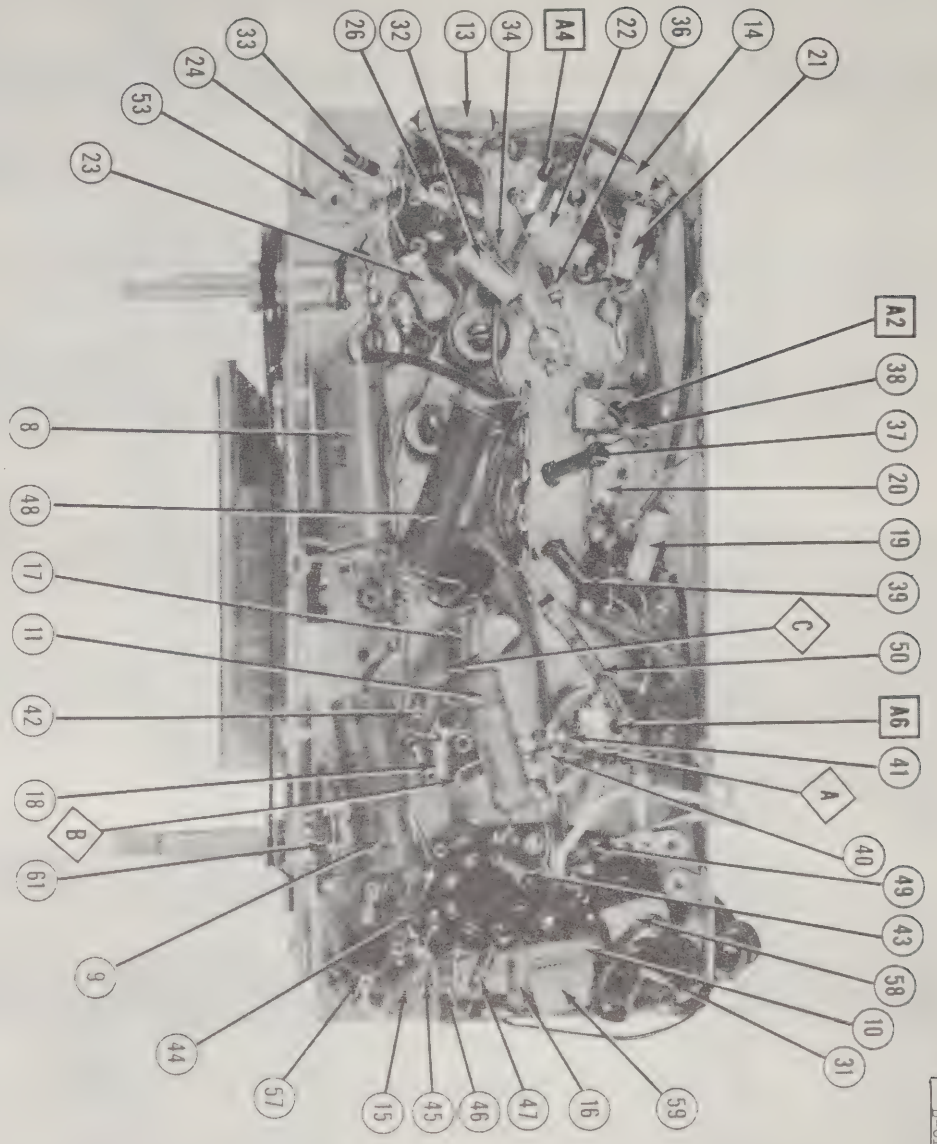
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					DeWALD PART No.		
60	Bayonet	6-8	0.15	Brown	#47		Type 47

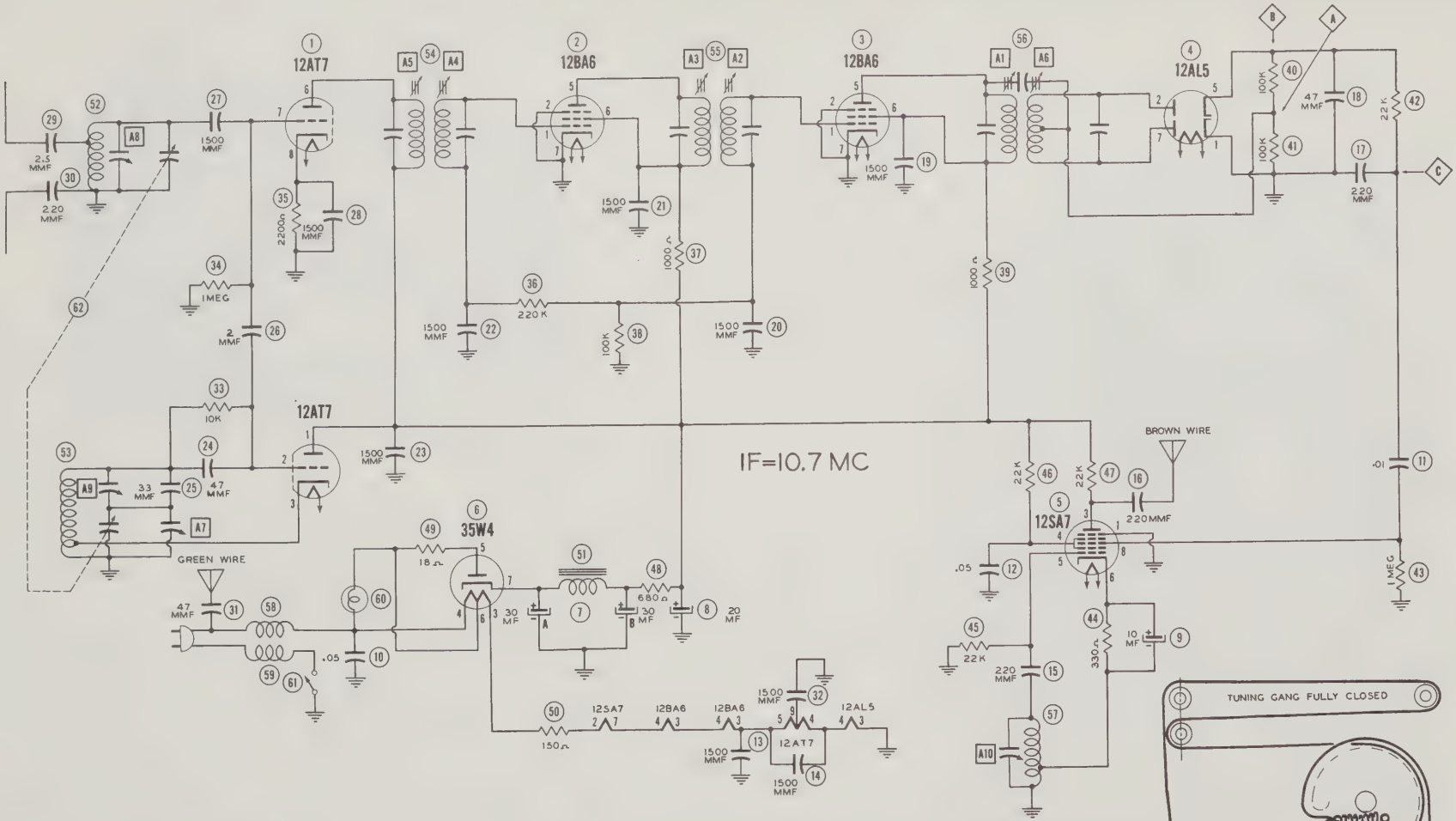
MISCELLANEOUS

ITEM No.	PART NAME	DeWALD PART No.	NOTES
61	Switch	8003	On-Off
62	Tuning Gang	2023	
	Dial Scale	6014	
	Cabinet	4016	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	12AT7	0.2VDC	-.8VDC§	0V.	13VAC	26VAC	92VDC	-.6VDC	0V.	18VAC
2	12BA6	-.3VDC	0V.	39VAC	40VAC	75VDC	75VDC	0V.	-	-
3	12BA6	-.4VDC	0V.	40VAC	52VAC	75VDC	75VDC	0V.	-	-
4	12AL5	0V.	0V.	0V.	13VAC	0V.	0V.	0V.	-	-
5	12SA7	0V.	64VAC	60VDC	40VDC	-2VDC§	1.2VDC	52VAC	0V.	-
6	35W4	117VAC	0V.	87VAC	117VAC	114VAC	115VAC	130VDC	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	12AT7	50KΩ	10KΩ	0Ω	12Ω	23Ω	50KΩ	1 Meg.	0Ω	18Ω
2	12BA6	320KΩ	0Ω	23Ω	34Ω	50KΩ	50KΩ	0Ω	-	-
3	12BA6	100KΩ	0Ω	34Ω	44Ω	50KΩ	50KΩ	0Ω	-	-
4	12AL5	0Ω	100KΩ	0Ω	12Ω	200KΩ	200KΩ	100KΩ	-	-
5	12SA7	0Ω	50Ω	70KΩ	70Ω	22KΩ	330Ω	44Ω	1 Meg.	-
6	35W4	240Ω	INF.	210Ω	240Ω	250Ω	230Ω	50KΩ	-	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS. THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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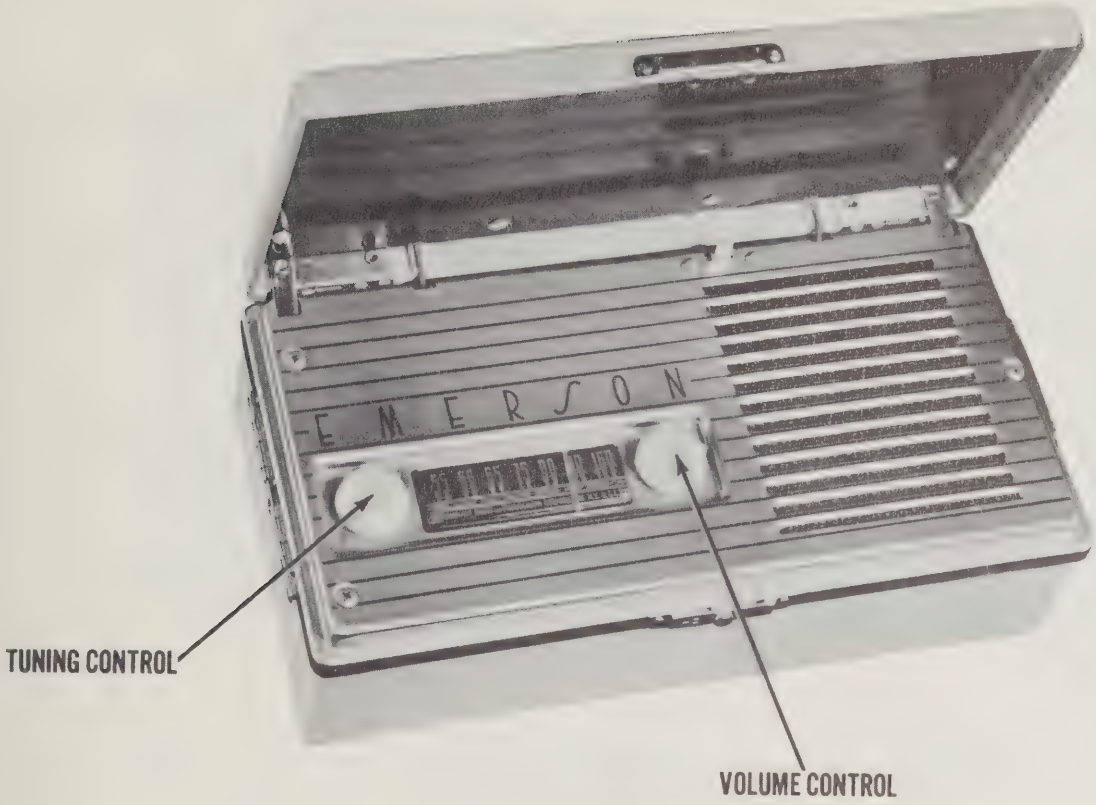
4812-9

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

EMERSON MODEL 569A (Ch. 120062A)
BATTERY-LINE OPERATED

EMERSON MODEL 569A (Ch. 120062A)
BATTERY-LINE OPERATED



EMERSON MODEL 569A (Ch. 120062A)
BATTERY-LINE OPERATED

EMERSON MODEL 569A

TRADE NAME	Emerson, Model 569A (Ch. 120062A)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th Ave., New York, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES(FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output.
POWER SUPPLY	110-120 Volts AC-DC or 6 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.12 Amp. @ 117 Volts AC or 65MA @ 6.2 Volts DC and 8 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver foradjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 1R5. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF. to reduce hum modulation.
2		Loop	1600KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	600KC	Tune for maximum output.	"	A6	Rock tuning cap. and adjust for maximum output. Repeat Steps 2 & 3 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 7/48-#4812-10 SET #42-FOLDER #10

PARTS LIST AND DESCRIPTIONS

EMERSON MODEL 569A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	80	150	925082					Filter-Blue
B	20	150						" -Red
6	100	25	925083			LB-100-15	UHC-102	Filament Bypass
7	.03	600	923006	684-03	DT6S3	MPH-6-02	TC-13	Line Filter
8	.05	200	920494		ZNW1S5	TTR-1.5-05		Line Isolation
9	.002	200	920550		ZZW1D2	TTR-1.5-002		Output Plate Bypass
10	.001	200	920497		ZZW1D1	TTR-1.5-001		Audio Coupling
11	.01	100	920499		ZZW1S1	TTR-1.5-01		AF Screen Bypass
12	.001	200	920497		ZZW1D1	TTR-1.5-001		Audio Coupling
13	.02	100	920498		ZNW2S2	TTR-1.5-02		IF Grid Filter
14	.02	100	920498		ZNW2S2	TTR-1.5-02		Conv. Screen Decoupling
15	.02	100	920498		ZNW2S2	TTR-1.5-02		AVC Filter
16	.05	200	920494		ZNW1S5	TTR-1.5-05		Filament Bypass
17	100	300	928013	1468-0001	5W5T1	MO.5-31		AF Plate Bypass-Cer.
18	212	300	928104	1468-0002	5W5T2	MO.5-32		Diode RF Filter-Cer.
19	100	300	928013	1468-0001	5W5T1	MO.5-31		Osc. Grid Cap.-Cer.

CONTROLS

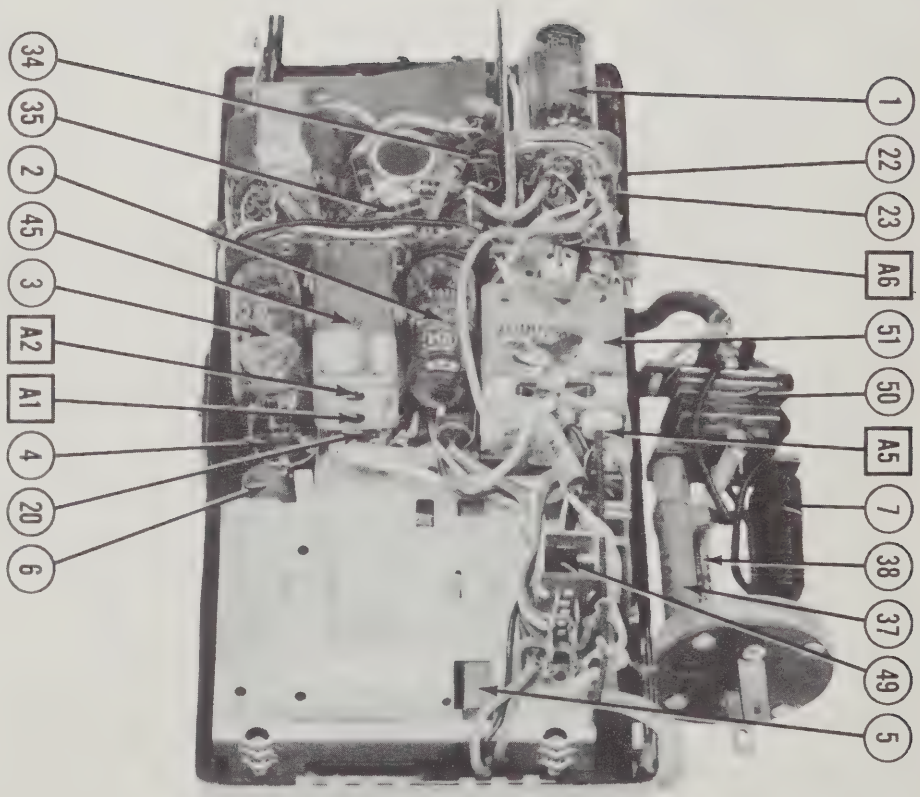
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	
20	1 Meg.	½	390025		15/16-63-2	Volume Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	
21	100KΩ	½	340970	BTS-100K	Br.-Blk.-Yl. Osc. Grid
22	5.6 Meg.	½	341390	BTS-5.6 Meg.	Grn.-Blue-Grn. IF Grid
23	3.3 Meg.	½	351330	BTS-3.3 Meg.	Or.-Or.-Grn. IF Grid
24	470Ω	½	340410	BTS-470	Yl.-Vi.-Br. Parasitic Suppressor
25	15KΩ	½	340770	BTS-15K	Br.-Grn.-Or. Conv. Screen Dropping
26	3.3 Meg.	½	351330	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
27	10 Meg.	½	351450	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
28	3.3 Meg.	½	351330	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen
29	470KΩ	½	351130	BTS-470K	Yl.-Vi.-Yl. AF Plate
30	1.5 Meg.	½	341250	BTS-1.5 Meg.	Br.-Grn.-Grn. Output Grid
31	5.6 Meg.	½	341390	BTS-5.6 Meg.	Grn.-Blue-Grn. Bias
32	470KΩ	½	351130	BTS-470K	Yl.-Vi.-Yl. Line Isolation
33	1500Ω	½	340530	BTS-1500	Br.-Grn.-Red Fil. String
34	560Ω	1	370430	BTA-560	Grn.-Blue-Br. " "
35	560Ω	1	370430	BTA-560	Grn.-Blue-Br. " "
36	3300Ω	½	340610	BTS-3300	Or.-Or.-Red Filter
37	2150Ω	10	394019	ABA-2250	Fil. Dropping-See Note 1
38	120Ω	3	394018	ABA-150	Rect. Ballast- " " 2

Note 1-Set slider on IRC replacement 100Ω from end.
Note 2-Set slider on IRC replacement 30Ω from end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		EMERSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
39	11600Ω	3.5Ω	620Ω	.6Ω	734019	A-3329		A-2999*	*Use frame of original to mount replacement.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
40	FIELD / PM	VC IMP. 3.5Ω	180029			
41	CONE DIA. 3-3/8"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.	
42	Ant. Loop		3.2Ω	700008		
43	Osc. Coil	2.1Ω	7.5Ω	716021		
44	Input IF	20.5Ω	17.5Ω	720028		Some models use Pt.#294805.
45	Output IF	20.5Ω	17.5Ω	720028		Some models use Pt.#294804.

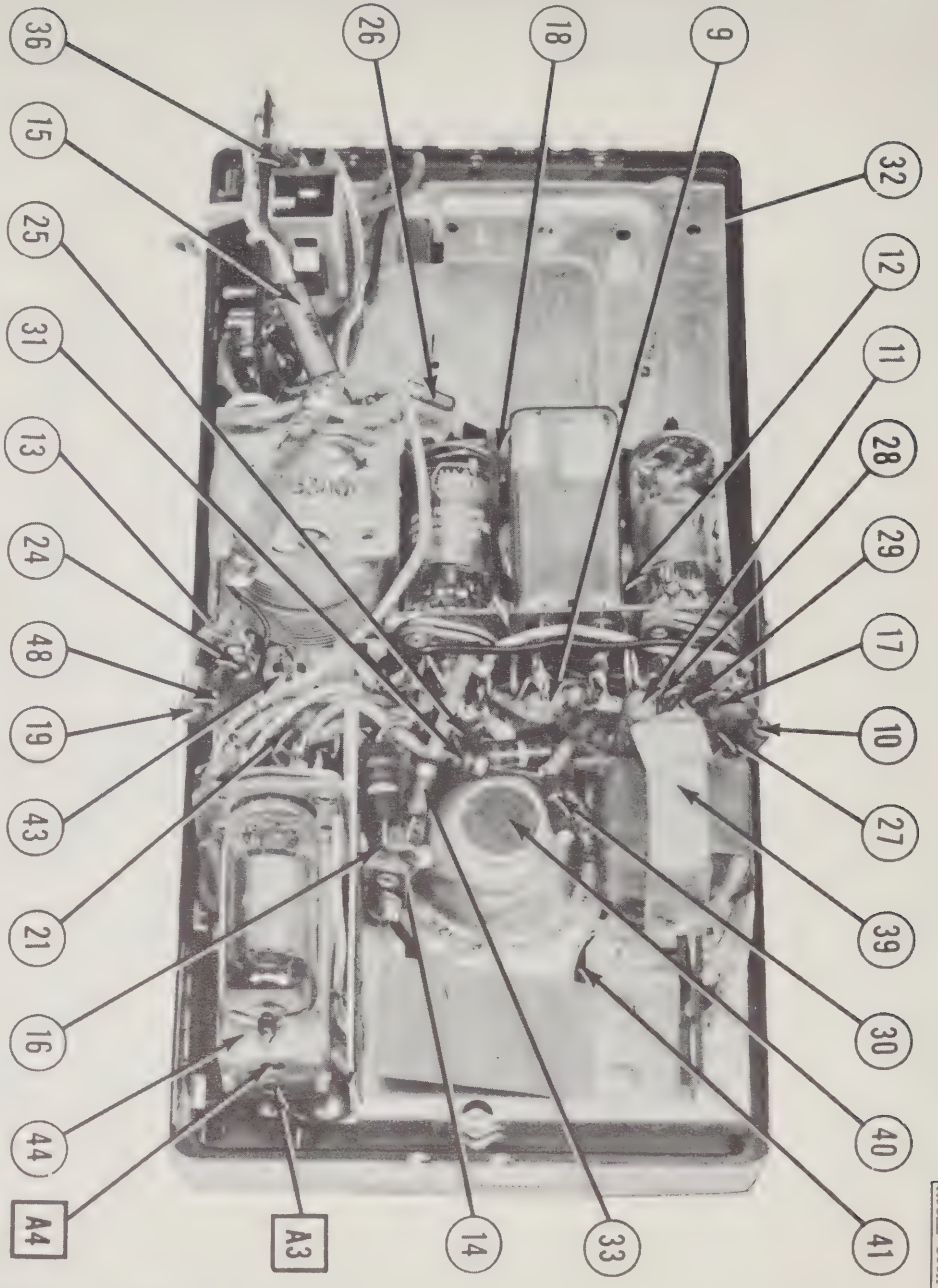
BATTERIES

ITEM No.	VOLTAGE	EMERSON PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
46	6V. "A"		#724			Z4			
47	67.5V "B"				#457		K45		

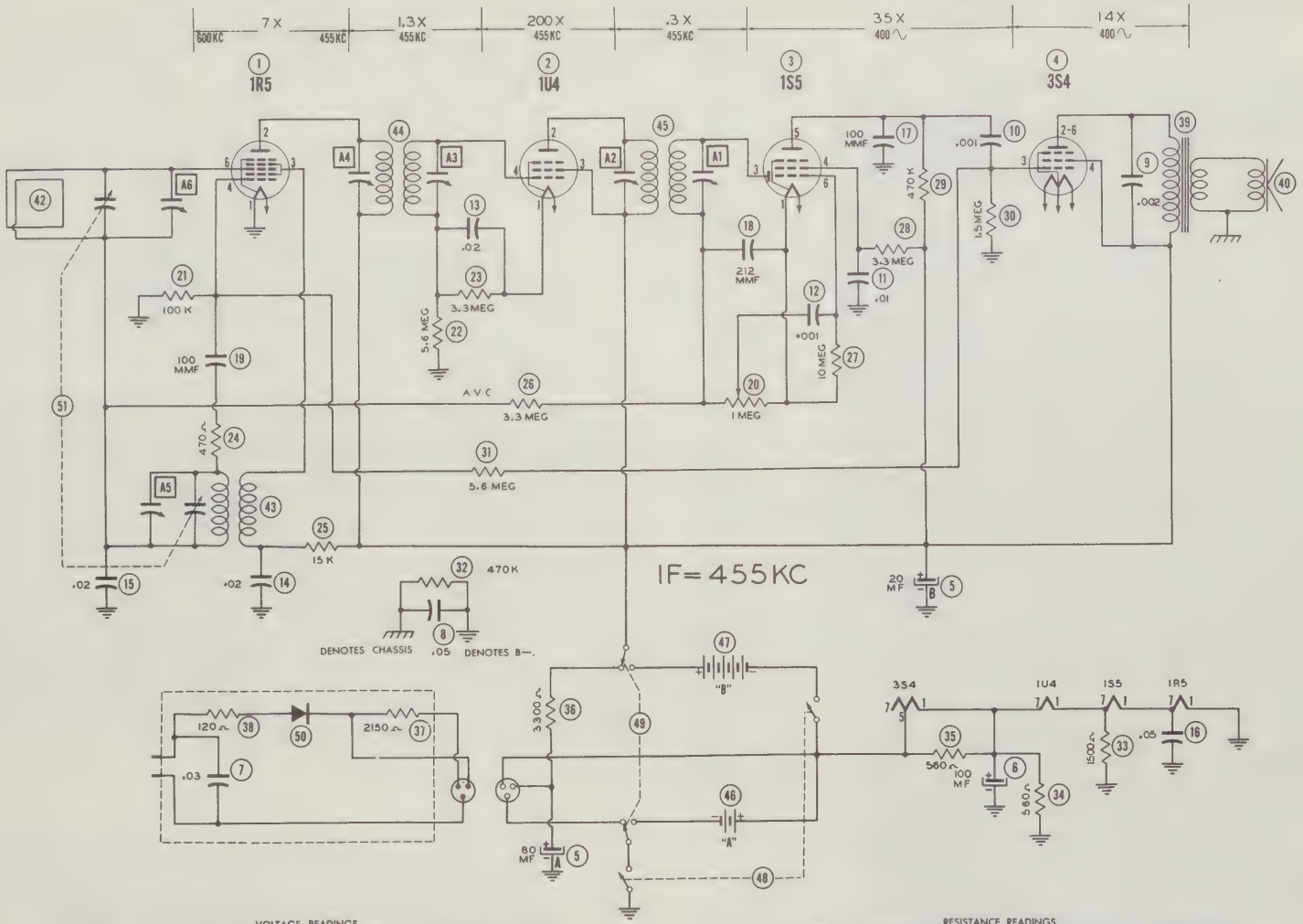
MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
48	Switch	510019	On-Off
49	"	510008	AC/DC-Batt.
50	Rectifier		Selenium
51	2 Gang Var. Cap.	920029	(12-277MMF, 13-130 MMF)
	Power Supply	470330	Unit
	Dial Crystal	520038	
	Dial Pointer	525016	

CHASSIS—BOTTOM VIEW



EMERSON MODEL 569A



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	78VDC	50VDC	-3.2VDC§	0V.	0V.	1.3VDC
2	1U4	2.5VDC	78VDC	78VDC	50VDC	2.5VDC	0V.	3.8VDC
3	1S5	1.3VDC	76VDC	.2VDC	17VDC	26VDC	0V.	2.5VDC
4	3S4	3.8VDC	75VDC	0V.	78VDC	5.2VDC	75VDC	5.2VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	540KΩ	20KΩ	100KΩ	0Ω	4.3 Meg.	*
2	1U4	*	540ΩΩ	540ΩΩ	20KΩ	*	2 Meg.	*
3	1S5	*	540ΩΩ	1 Meg.	3.3 Meg.	470KΩ	10 Meg.	*
4	3S4	*	600ΩΩ	1.5 Meg.	540ΩΩ	*	600ΩΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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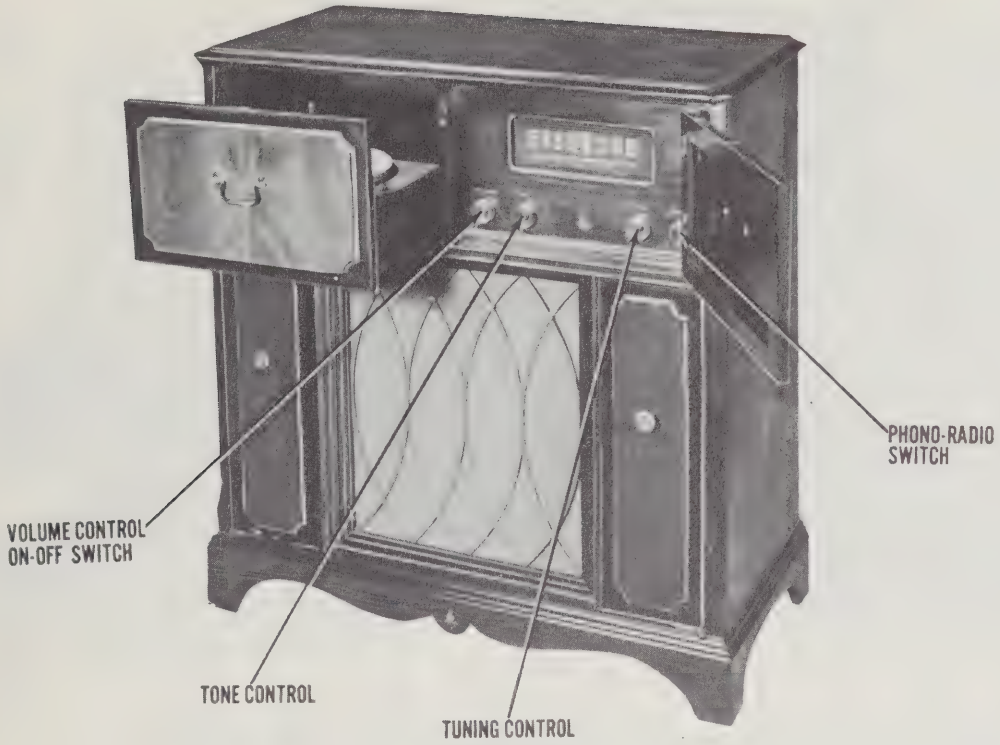
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin 1 of 1S5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

EMERSON MODEL 573B
(Ch. 120039B)



EMERSON MODEL 573B
(Ch. 120039B)

EMERSON MODEL 573B

TRADE NAME	Emerson, Model 573B (Ch. 120039B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th Ave., New York, N.Y.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (NINE)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-Phase Inv., 6SQ7 AF Amp., 6U5/6G5 Tuning Eye, (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .73 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 2-3/8" from left edge of dial backplate. This is the calibration mark referred to below.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	.1 MFD.	High side to ext antenna lead. Low side to chassis.	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3	200MMFD	"	1400KC	5" from calibration mark.	"	A6	Adjust for maximum output.
4	200MMFD	"	"	Tune for maximum output.	"	A7	" " " "

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DATE 7/48-#4812-11 SET #42-FOLDER #11

PARTS LIST AND DESCRIPTIONS

EMERSON MODEL 574B

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC-Phase Inv.	6SQ7	6SQ7	8Q	
5	AF Amp.	6SQ7	6SQ7	8Q	
6	Tuning Eye	6U5/6G5	6U5/6G5	6R	
7	Power Output	6V6GT	6V6GT	7AC	
8	" "	6V6GT	6V6GT	7AC	
9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10A	16	450	925007	AF444J	UP22245C*	DY-3x20-450	EL-420*	Filter-Red
B	16	450						" -Red & White
C	16	450						" -Blue
11	.01	400	922020	484-01	DT4S1	MPH-4-01	TC-11	Line Filter
12	.005	600	920230	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
13	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
14	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	"
15	.1	400	920250	484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
16	.005	600	920230	684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
17	.002	600	920010	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
18	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	Tone Comp.
19	.1	200	920040	484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
20	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	Decoupling
21	.05	400	920030	484-05	DT4S5	ST-4-05	TC-15	RF Screen Bypass
22	220	500	910000	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
23	220	500	910000	1468-00025	5W5T25	MO.5-325	1FM-325	Tone Comp.
24	110	500	910010	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
25	4.7	300	923004	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer
26	220	500	910000	1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling
27	50	500	910250	1468-00005	5W5Q5	MO.5-45	1FM-45	" "
28	50	500	910250	1468-00005	5W5Q5	MO.5-45	1FM-45	Phono Tone Comp.

*Omit one section.
#Omit bypass section.

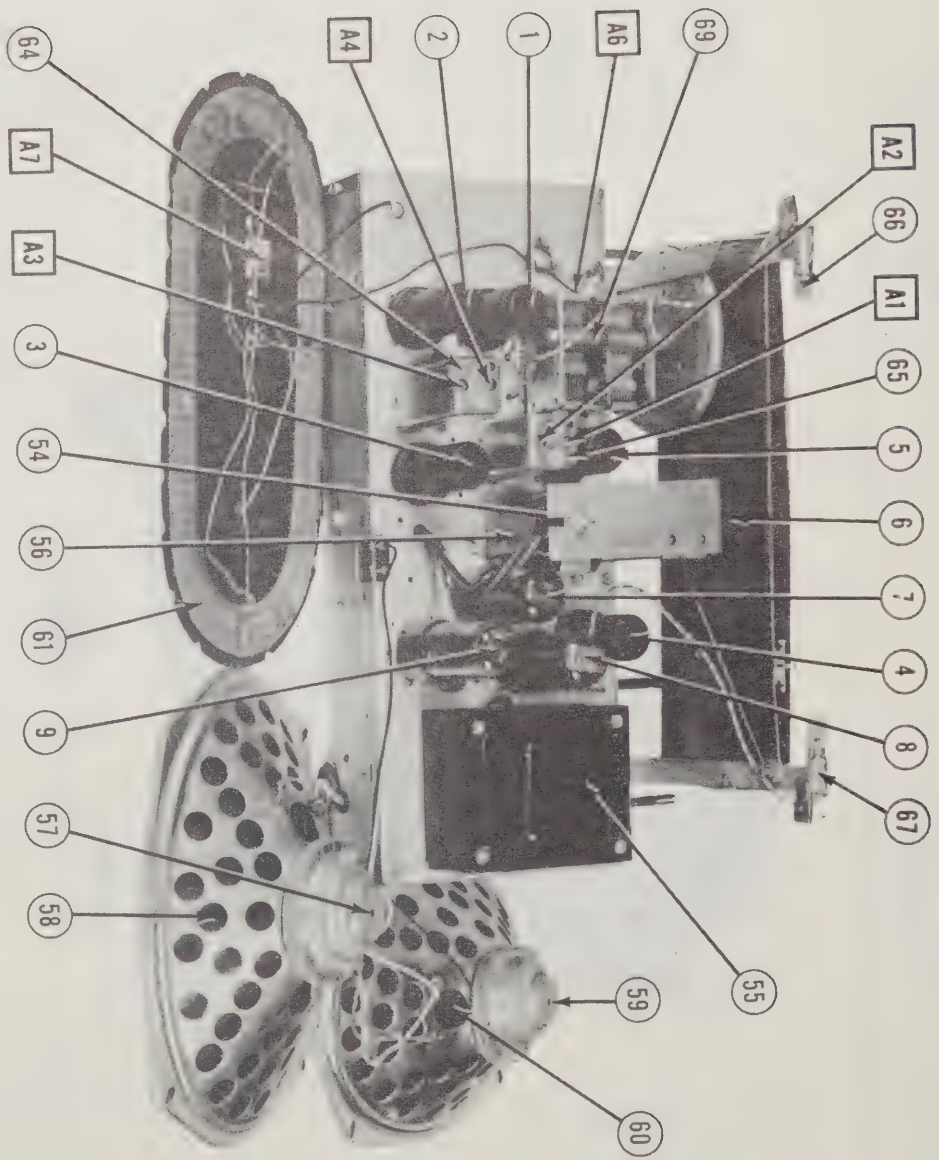
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
29A	500KΩ	½	390006	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 29A per instructions
C	Switch		" "	41	SW-A	" " " " "
30A	400KΩ	½	390007	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 30A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	IDENTIFICATION CODES
31	47KΩ	½	351130	BTS-470K	Yl.-Vi.-Yl. RF Grid
32	47KΩ	½	340890	BTS-47K	Yl.-Vi.-Or. RF Screen
33	10KΩ	½	340730	BTS-10K	Br.-Blk.-Or. RF Plate Load
34	240KΩ	½	351050	BTS-220K	Red-Blk.-Or. Conv. Grid
35	22KΩ	½	340810	BTS-22K	Red-Red-Or. Osc. Grid
36	1200Ω	½	340510	BTS-1200	Br.-Red-Red Decoupling
37	15 Meg.	½	397000	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
38	2.2 Meg.	½	351290	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
39	4700Ω	½	350650	BTS-4700	Yl.-Vi.-Red Tone Comp.
40	4700Ω	½	350650	BTS-4700	Yl.-Vi.-Red " "
41	15 Meg.	½	397000	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
42	470KΩ	½	351130	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
43	150KΩ	½	351010	BTS-150K	Br.-Grn.-Yl. AF Plate Decoupling

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

44	240KΩ	±	351050	BTS-220K	Red-Yl.-Yl. Phase Inv. Grid
45	240KΩ	±	351050	BTS-220K	Red-Yl.-Yl. Phase Inv. Plate Load
46	240KΩ	±	351050	BTS-220K	Red-Yl.-Yl. Output Grid
47	220KΩ	±	351050	BTS-220K	Red-Red-Yl. Output Grid
48	180Ω	2	394140	BW-2-180	Output Cathode
49	10Ω	±	340010	BW-½-10	Br.-Blk.-Blk. Phase Inv. Cathode Feedback
50	1 Meg.	±	351210	BTS-1 Meg.	Br.-Blk.-Grn. Phono Feedback
51	6800Ω	5	394002	AB-7000	Filter
52	560Ω	2	387001	BT-2-560	Grn.-Blue-Br. " -See Note
53	1 Meg.	±	351210	BTS-1 Meg.	Br.-Blk.-Grn. Series Phono
54	1 Meg.	±	Part of 585001	BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load

Note-Some models use (2) 270Ω 1 Watt resistors connected in series in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	EMERSON PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
55	117V AC @ .73A	600V CT @ .115A	5.2V AC @ 2.0A	6.6V AC @ 3.15A	730017	P-6013†	T-22RC5	P-2953†

†Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		EMERSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
56	10500Ω CT	2Ω	325Ω CT	.8Ω	734005	A-3870		A-2905§	§Drill one new mounting hole

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
57	FIELD	VC IMP.	180037		69A3	
	PM	4Ω				
58	CONE DIA.	VC DIA.				
	6"x9"	1"				
59	FIELD	VC IMP.	180037		69A3	
	PM	4Ω				
60	CONE DIA.	VC DIA.				
	6"x9"	1"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.
61A	Loop Ant.		1.3Ω	700024	
B	Ant.Coupling		0Ω		
62	Wave Trap		65Ω	708060	
63	Osc. Coil	1Ω	6.8Ω	716050	14-1060
64	Input IF	21Ω	21Ω	720532	16-6666
65	Output IF	31Ω		720533	16-6670

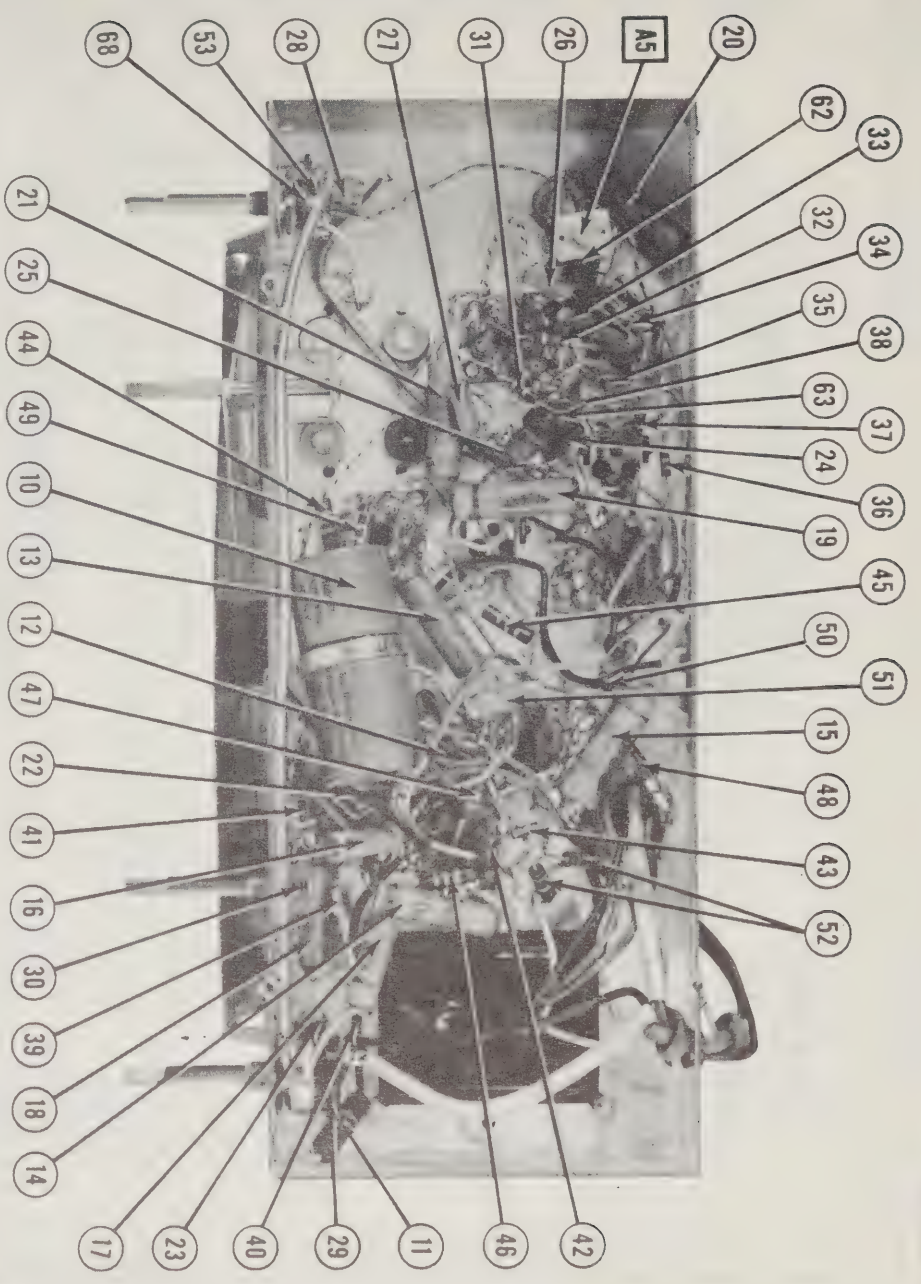
DIAL LIGHT

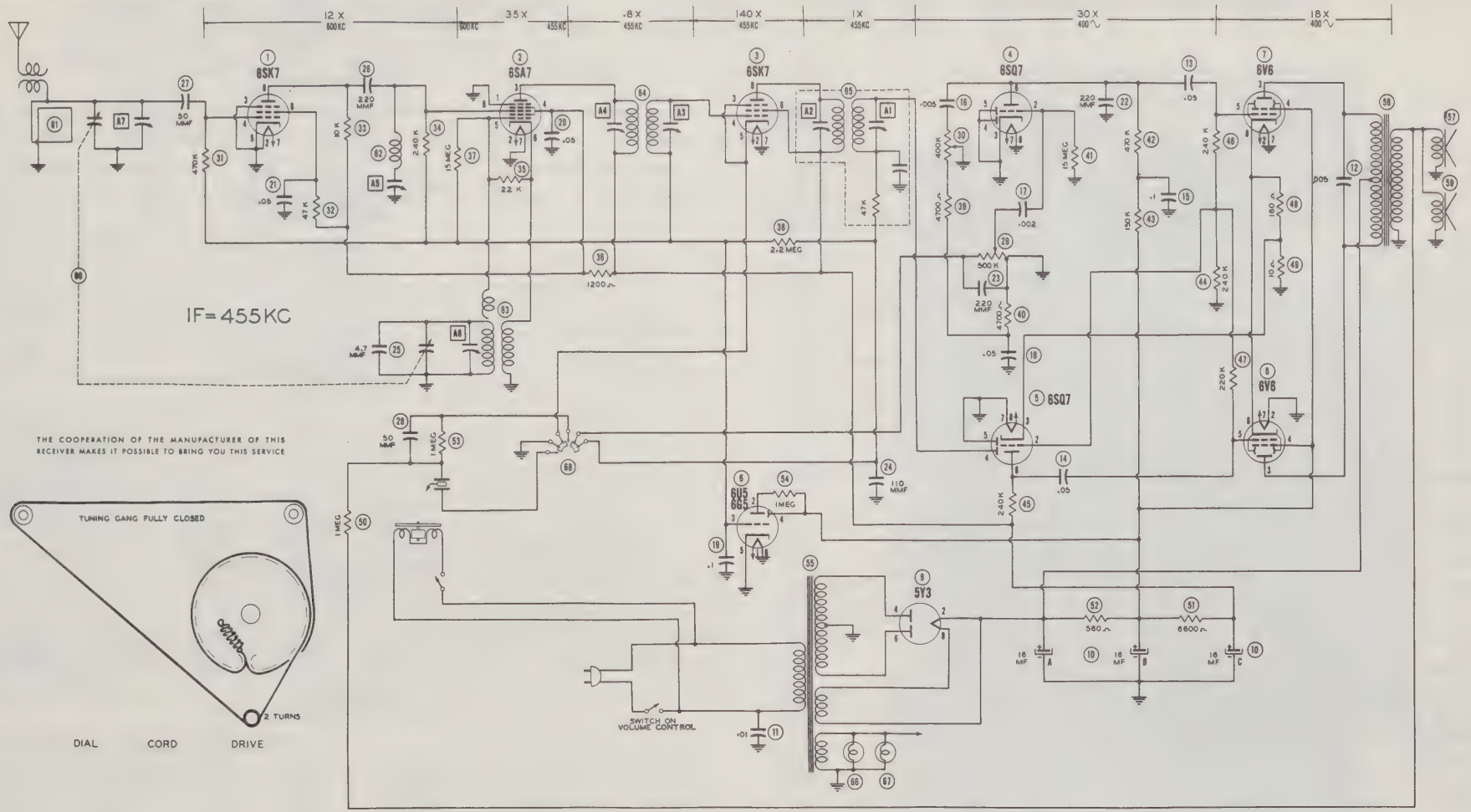
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					EMERSON PART No.		
66	Bayonet	6-8	0.25	Blue	807020		Type 44
67	"	6-8	0.25	"	807020		" "

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
68	Switch	510002	Radio-Phono
69	2 Gang Var. Cap.	900008	(16-476MMF, 30-203MMF)
	Dial Crystal	520062	
	Dial Pointer	525027	

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	0V.	0V.	-.3VDC	0V.	43VDC	6.6VAC	53VDC
2	6SA7	0V.	6.6VAC	95VDC	80VDC	-11VDC§	0V.	0V.	-.2VDC
3	6SK7	0V.	6.6VAC	0V.	-.3VDC	0V.	95VDC	0V.	95VDC
4	6SQ7	0V.	-.5VDC	0V.	0V.	0V.	95VDC	6.6VAC	0V.
5	6SQ7	0V.	-.1VDC	.7VDC	-.1VDC	0V.	55VDC	0V.	6.6VAC
6	6U5/6G5	-	-	-	-	-	-	-	-
7	6V6GT	0V.	6.6VAC	280VDC	280VDC	0V.	90VDC	0V.	15VDC
8	6V6GT	0V.	0V.	295VDC	280VDC	0V.	-.1VDC	6.6VAC	15VDC
9	5Y3GT	0V.	300VDC	225VDC	300VAC	78VAC	300VAC	.7VDC	300VDC

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	0Ω	0Ω	3.1 Meg.	0Ω	200KΩ	.1Ω	150KΩ
2	6SA7	0Ω	.1Ω	150KΩ	150KΩ	22KΩ	1Ω	0Ω	2.0 Meg.
3	6SK7	0Ω	.1Ω	0Ω	2.7 Meg.	0Ω	150KΩ	0Ω	150KΩ
4	6SQ7	0Ω	15 Meg.	0Ω	0Ω	0Ω	770KΩ	.1Ω	0Ω
5	6SQ7	0Ω	240KΩ	1Ω	550KΩ	0Ω	370KΩ	0Ω	.1Ω
6	6U5/6G5	-	-	-	-	-	-	-	-
7	6V6GT	0Ω	.1Ω	150KΩ	150KΩ	460KΩ	150KΩ	0Ω	190Ω
8	6V6GT	0Ω	0Ω	150KΩ	150KΩ	460KΩ	220KΩ	.1Ω	190Ω
9	5Y3GT	INF.	150KΩ	300KΩ	85Ω	INF.	88Ω	1Ω	150KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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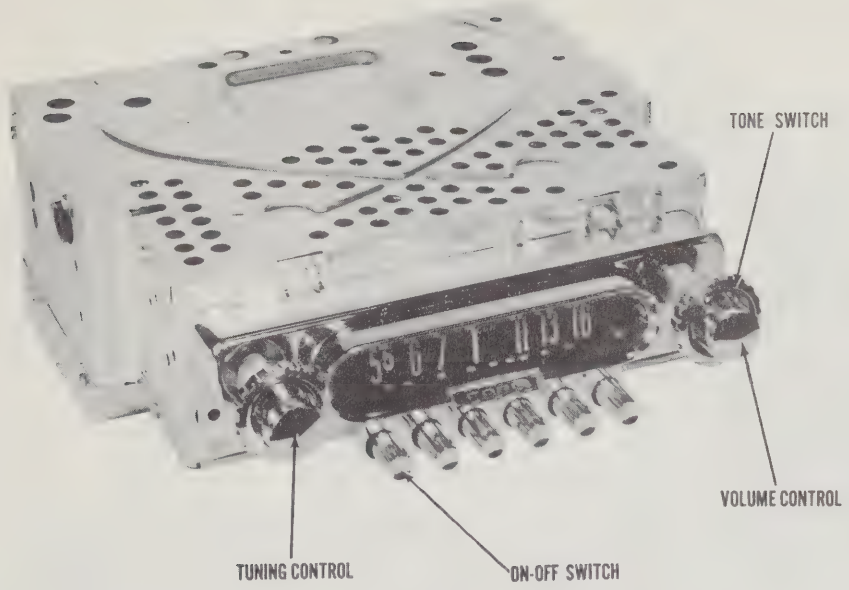
4812-11

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**



FORD MODEL 8MF880

TRADE NAME	Ford, Model 8MF880 (8A 18805B)
SUPPLIER	Ford Motor Car Co., Detroit, Michigan
TYPE SET	Battery Operated Custom-Built Automotive Superheterodyne Receiver
TUBES (EIGHT)	Types, 7A7 RF Amp., 7B8 Converter, 6BA6 IF Amp., 7E6 Det.-AVC-AF, 7AF7 AF-Inv., (2) 6V6GT Power Output, 7Y4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 7.6 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Plug foot volume control in its socket during alignment.

Dummy antenna consists of two 30 MMFD capacitors in series across output of sig. gen. Connect receiver antenna to the junction of the two cap. and low side of sig. gen. to chassis of receiver. This value of dummy antenna must be used to insure proper tracking when receiver is installed in car.

If calibration is off after completing adjustments it can be corrected with adjustment screw at pivot end of pointer arm.

If cores are adjusted, apply speaker cement to core screws.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 7B8. Low side to chassis.	265KC	Tuning slugs fully out.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	See pre-alignment notes.	See pre-alignment notes.	535KC	535KC	"	A5	" " " "
3	"	"	1200KC	Tune for maximum output.	"	A6,A7, A8	" " " "
	The following procedure should be followed only when a core or coil has been replaced.						
4	See pre-alignment notes.	See pre-alignment notes.	1700KC	Tuning slugs fully out.	Across voice coil	A5,A6, A7,A8	Screw the cores completely out of the antenna, RF, Converter and oscillator coils. Adjust A5, A6, A7 & A8 for maximum output. Replace cores to their approximate original positions.
5	"	"	1200KC	1200KC	"	A9	Adjust for maximum output.
6	"	"	"	Tune for maximum output.	"	A10,All A12	" " " "
7	"	"	600KC	"	"	A13	Rock tuning control and adjust for maximum output. Check receiver at 1200KC. If weak or off calibration repeat Steps 5, 6 and 7.

After all adjustments have been made, reinstall receiver in car. Allow to warm up for at least fifteen minutes, and with antenna extended, tune in weak station near 1200KC and adjust A8 for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 7/48-#4812-12 SET #42-FOLDER #4812-12

PARTS LIST AND DESCRIPTIONS

FORD MODEL 6MF8[illegible]
(6A 18805B)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7B8	7B8	8X	
3	IF Amp.	6BA6	6BA6	7BK	
4A	Det.-AVC-AF	7E6	7E6	8W	
B	Det.-AVC-AF	6SR7GT	6SR7GT	8Q	
5	AF-Inverter	7AF7	7AF7	8AC	
6	Power Output	6V6GT	6V6GT	7AC	
7	" "	6V6GT	6V6GT	7AC	
8	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	400		AF44J4A	UP2245C	DY-312	EL-322	■ Filter
B	20	400						▲ "
C	20	25						Cathode Bypass
10	20	25		PRS25/25	BR202A	M-25-25	TA-25	" "
11	.007	1600		1689-007	MD1607	STM-16-007	TR-27	Buffer
12	.5	100		484-.5	DT2P5	SHH-1	TC-5	Hash Filter
13	.5	120		484-.5	DT2P5	SHH-1	TC-5	" "
14	.0033	600		684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
15	.0033	600		684-003	DT6D3	ST-6-003	TC-23	" " "
16	.022	600		684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
17	.022	600		684-02	DT6S2	ST-6-02	TC-12	" "
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
19	.047	600		684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
20	.0015	600						Tone Comp.
21	.01	200		484-01	DT2S1	ST-4-01	TC-11	" "
22	.005	200		484-005	DT6D5	ST-6-005	TC-25	" "
23	.005	400		484-005	DT6D5	ST-6-005	TC-25	Audio Coupling
24	.022	200		484-02	DT2S2	ST-4-02	TC-12	AVC Filter
25	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Cathode Bypass
26	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
27	.0047	600		684-005	DT6D5	ST-6-005	TC-25	Common Coupling
28	250			1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
29	150			1468-00015	5W5T15	MO.5-315	1FM-315	Tone Comp.
30	750			1468-00075	1W5T7	MO.3-37	1FM-37	" "
31	100			1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
32	100			1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Feedback-Cer.
33	100			1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
34	260							Fixed Trimmer-Cer.
35	250			I469-00025	5R5T25	MOS.5-325	MS-325	" "
36	100			1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.

CONTROLS

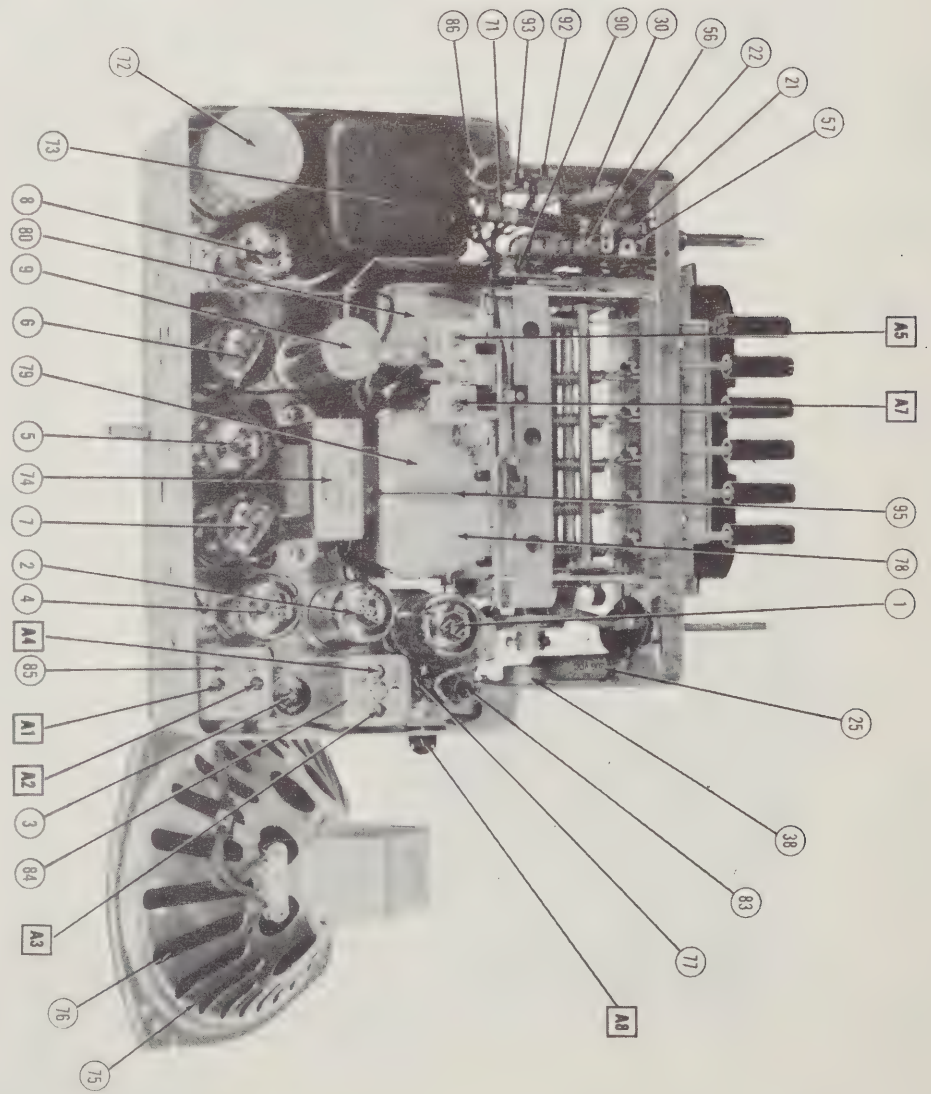
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
37	1 Meg.	½				#Volume Control and Tone Switch
38	800Ω	1				Sensitivity Control

#Tapped @ 200KΩ and 400KΩ.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
39	330KΩ	½		BTS-330K	Or.-Or.-Yl. RF Grid
40	10KΩ	½		BTS-10K	Br.-Blk.-Or. RF Plate Load
41	330KΩ	½		BTS-330K	Or.-Or.-Yl. Conv. Grid
42	68KΩ	½		BTS-68K	Blue-Gray-Or. Osc. Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

43	12 Meg.	½		BTS-12 Meg.	Br.-Red-Blue AVC Network-See Note
44	18KΩ	½		BTS-18K	Br.-Gray-Or. Osc. Grid
45	15KΩ	½		BTS-15K	Br.-Grn.-Or. Conv. Screen Dropping
46	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
47	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
48	470Ω	½		BTS-470	Yl.-Vi.-Br. IF Cathode
49	33KΩ	1		BTA-33K	Or.-Or.-Or. Screen Dropping
50	220KΩ	½		BTS-220K	Red-Red-Yl. Tone Compensation
51	220KΩ	½		BTS-220K	Red-Red-Yl. Diode Load
52	1500Ω	½		BTS-1500	Br.-Grn.-Red 1st AF Cathode
53	56KΩ	½		BTS-56K	Grn.-Blue-Or. 1st AF Plate Load
54	27KΩ	½		BTS-27K	Red-Vi.-Or. 1st AF Plate Decoup.
55	120KΩ	½		BTS-120K	Br.-Red-Yl. Tone Compensation
56	68KΩ	½		BTS-68K	Blue-Gray-Or. " "
57	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " "
58	56KΩ	½		BTS-56K	Grn.-Blue-Or. " "
59	330KΩ	½		BTS-330K	Or.-Or.-Yl. 2nd AF Grid
60	56KΩ	½		BTS-56K	Grn.-Blue-Or. 2nd AF Plate Load
61	1000Ω	½		BTS-1000	Br.-Blk.-Red AF Cathode
62	30KΩ	½		BTS-33K	Or.-Blk.-Or. Phase Inv. Grid
63	56KΩ	½		BTS-56K	Grn.-Blue-Or. Phase Inv. Plate Load
64	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
65	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
66	33Ω	2		BW-2-33Ω	Or.-Or.-Br. Output Cathode
67	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Feedback
68	1800Ω	2		BT-2-1800	Br.-Gray-Red Filter
69	82Ω	½		BW-½-82	Gray-Red-Blk.-Mash Suppressor
70	82Ω	½		BW-½-82	Gray-Red-Blk. " "
71	5.1Ω	2		BW-2-4.7	Grn.-Br. Gold Series Pilot Light

Note-Not used in all models.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA RADIART PART No.	INSTALLATION NOTES
72	Interrupter	6.3V DC	115∿	190-22A	5300	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
73	6.3V DC @ 4.4A	590V AC .067A DC			95-1071		T-22R20*	

*Drill new mounting holes.

TRANSFORMER (OUTPUT)

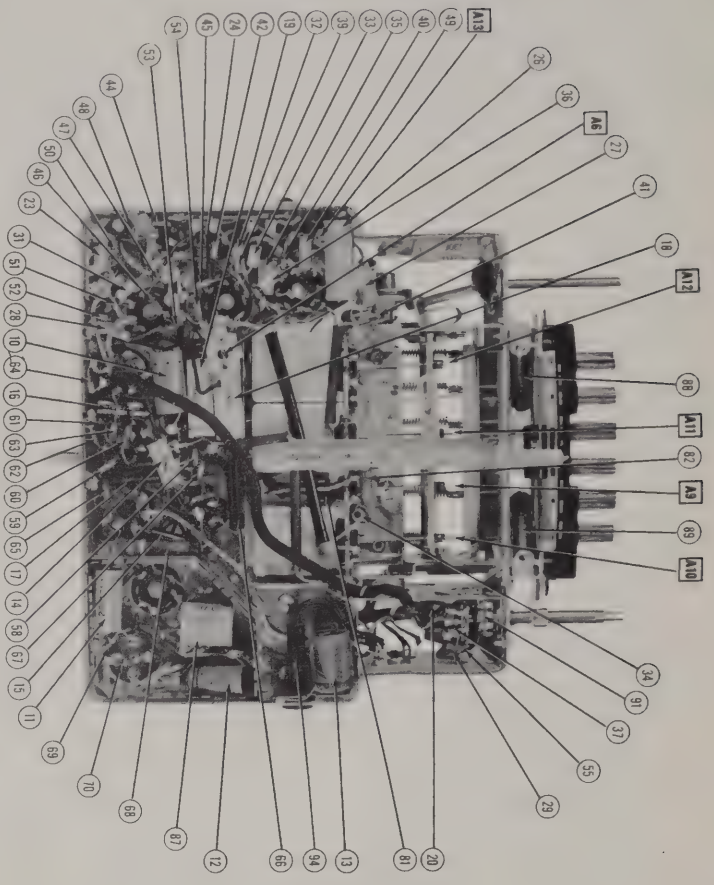
ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
74	9000Ω CT	3.6Ω	370Ω CT	.6Ω	95-1079	A-3823	T-22S47†	A-2936	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
75	PM	3.6Ω	49-627		69A3	
	CONE DIA.	VC DIA.				
76	6"x9"	3/4"				

DATE 7/48-#4812-12 SET #42-FOLDER #4812-12

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA MEISSNER PART No.	
77	Ant. Loading		.9Ω			
78	Ant. Coup.		13Ω			
79	Ant. Coil		13Ω			
80	RF Coil		13Ω			
81	Osc. Coil		7.9Ω			
82	Osc. Trimmer Coil		.7Ω			
83	Osc. Shunt Coil	3.6Ω	4.8Ω			
84	Input IF	45Ω	45Ω			
85	Output IF	60Ω				
86	RF Choke		.1Ω			
87	" "		.1Ω	20-216		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	LEAD COLOR	REPLACEMENT DATA ZENITH PART No.		INSTALLATION NOTES
88	Bayonet	6-8	0.25	Blue			Type 44
89	"	6-8	0.25	"			" "

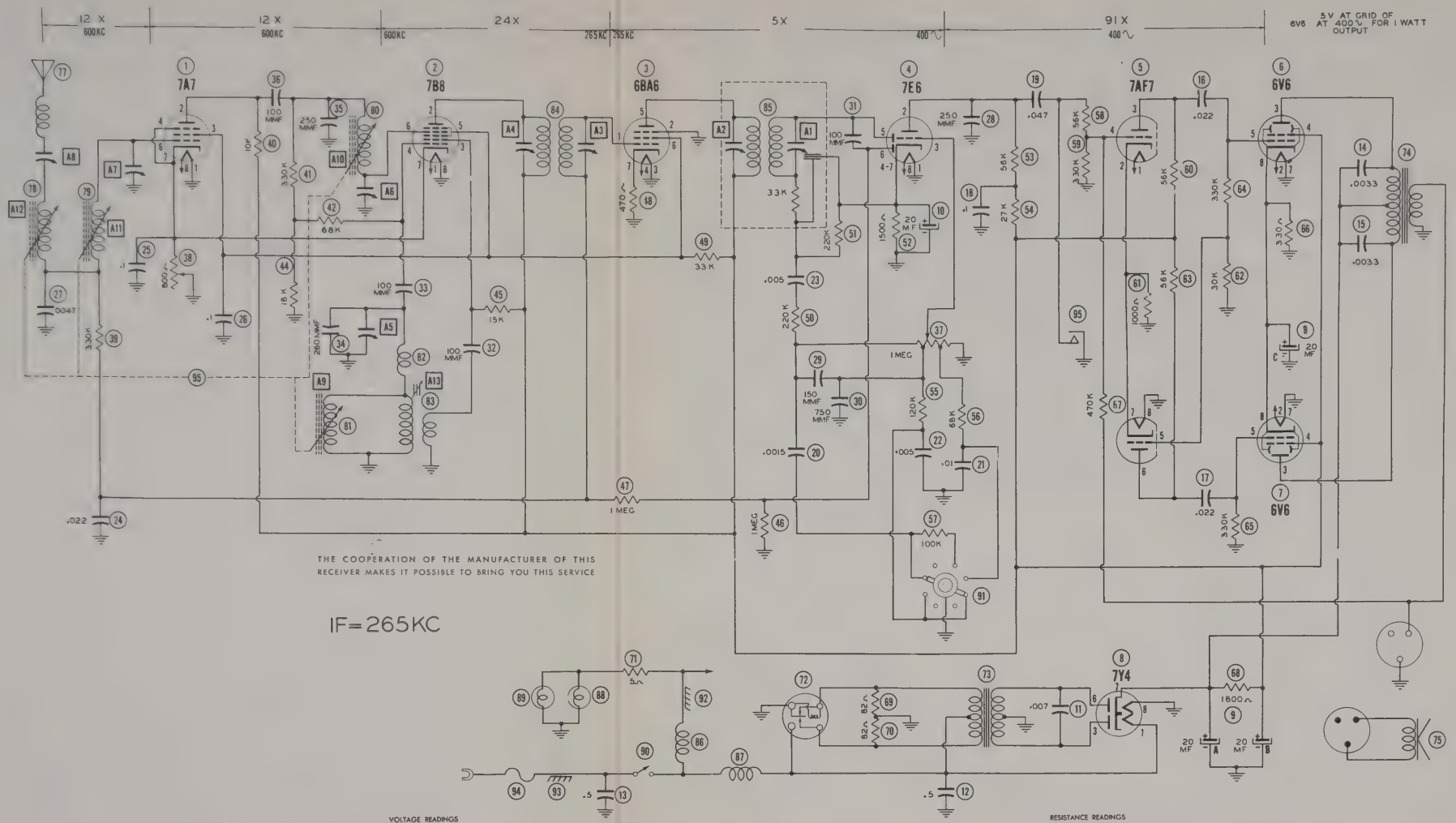
MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
90	Switch		Power
91	"		Tone
92	Spark Plate		500 MFD.
93	" "		" "
94	Fuse		14 Amp.
95	Tuning Assby.		

DATE 7/48-#4812-12 SET #42-FOLDER #12

PUSHBUTTON ADJUSTMENTS

1. Turn set on and allow to warm up for at least fifteen minutes.
2. Make up a list of stations desired to be set up.
3. Tune in the first station selected with the manual tuning control.
4. Loosen any button for this station, by turning counter-clockwise a few turns.
5. Push button completely in and release.
6. Tighten the button firmly.
7. To check accuracy of setting, detune with manual control and retune with push-button. If setting is off repeat Steps 3, 4, 5 and 6.
8. To set up the remaining buttons follow the procedure outlined above.



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0V.	200VDC	95VDC	6.6VDC††	0V.	0V.	6.6VDC††	6.2VDC
2	7B8	6.2VDC	220VDC	160VDC	-6.5VDC§	95VDC	-1VDC	6.6VDC††	0V.
3	6BA6	0V.	0V.	0V.	6.2VDC	220VDC	95VDC	2.7VDC	-
4	7E6	0V.	68VDC	0V.	2.5VDC	1VDC	0V.	2.5VDC	6.2VDC
5	7AF7	6.2VDC	4.3VDC	98VDC	0V.	0V.	96VDC	4.3VDC	0V.
6	6V6GT	0V.	6.2VDC	255VDC	215VDC	0V.	0V.	0V.	13VDC
7	6V6GT	0V.	6.2VDC	255VDC	215VDC	0V.	0V.	0V.	13VDC
8	7Y4	6.2VDC	0V.	295VAC	295VAC	0V.	295VAC	260VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0Ω	4 Meg.	4 Meg.	800Ω††	0Ω	2.3 Meg.	800Ω††	.1Ω
2	7B8	.1Ω	4 Meg.	4 Meg.	86KΩ	4 Meg.	350KΩ	800Ω††	0Ω
3	6BA6	2 Meg.	0Ω	0Ω	.1Ω	4 Meg.	4 Meg.	470Ω	-
4	7E6	0Ω	4 Meg.	500KΩ	1.5KΩ	255KΩ	1 Meg.	1.5KΩ	.1Ω
5	7AF7	.1Ω	1KΩ	4 Meg.	180KΩ	30KΩ	4 Meg.	1KΩ	0Ω
6	6V6GT	0Ω	.1Ω	4 Meg.	4 Meg.	360KΩ	INF.	0Ω	330Ω
7	6V6GT	0Ω	.1Ω	4 Meg.	4 Meg.	330KΩ	INF.	0Ω	330Ω
8	7Y4	.1Ω	INF.	230Ω	230Ω	INF.	210Ω	4 Meg.	0Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

††READINGS TAKEN WITH SENSITIVITY CONTROL SET AT MAXIMUM.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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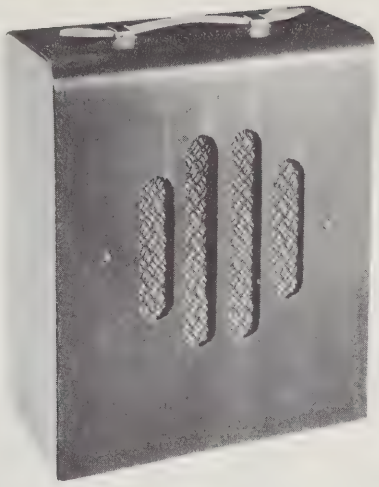
4812-12

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

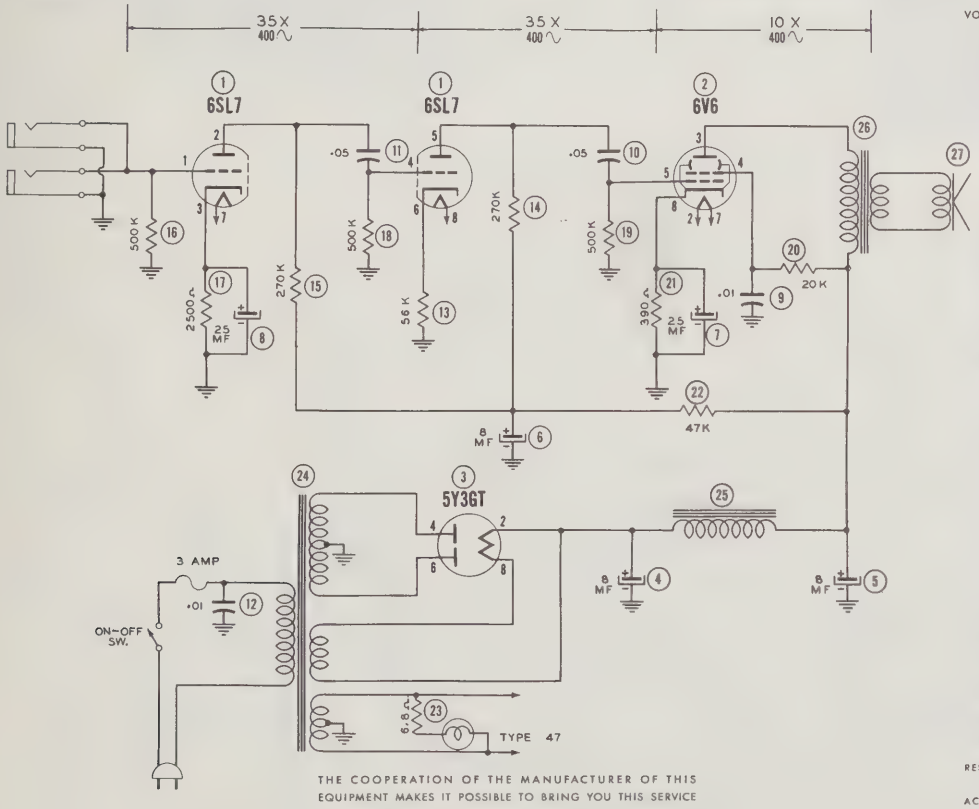
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

KAY MUSICAL INSTRUMENT CO.
MODEL 77



KAY MODEL 77

TRADE NAME	Kay, Model 77
MANUFACTURER	Kay Musical Instr. Co., 1640 W. Walnut St., Chicago, Ill.
TYPE SET	AC Operated Musical Instrument Amplifier.
TUBES (THREE)	Types, 6SL7GT RF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .44 Amp. @ 117 Volts AC



VOLTAGE AND RESISTANCE READINGS

Pin No.	6SL7GT Volt.	Res.
1	0V.	0Ω
2	110VDC	400KΩ
3	1.6VDC	2.5KΩ
4	0V.	500KΩ
5	270VDC	400KΩ
6	2.5VDC	56KΩ
7	3.3VAC	.1Ω
8	3.3VAC	.1Ω

Pin No.	6V6GT Volt.	Res.
1	0V.	INF.
2	3.3VAC	.1Ω
3	335VDC	100KΩ
4	297VDC	120KΩ
5	0V.	500KΩ
6	0V.	INF.
7	3.3VAC	.1Ω
8	15.5VDC	400Ω

Pin No.	5Y3GT Volt.	Res.
1	0V.	INF.
2	360VDC	100KΩ
3	0V.	INF.
4	320VAC	380Ω
5	0V.	INF.
6	320VAC	400Ω
7	0V.	INF.
8	360VDC	100KΩ

GROUND INPUT

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-13

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

HOWARD W. SAMS & CO., INC. ndianapolis 7, Indiana

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PARTS LIST AND DESCRIPTIONS

KAY MODEL 77

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KAY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	6SL7GT	6SL7GT	8BD	
2	Power Output	6V6GT	6V6GT	7AC	
3	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KAY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4	8	450	1001	PRS450-8	BR845	M-8-450	UT-8	Filter
5	8	450	1001	PRS450-8	BR845	M-8-450	UT-8	"
6	8	450	1001	PRS450-8	BR845	M-8-450	UT-8	AF Decoupling
7	25	25	1100	PRS25-25	BR252A	M-25-25	TA-25	Output Cathode Bypass
8	25	25	1100	PRS25-25	BR252A	M-25-25	TA-25	AF Cathode Bypass
9	.01	600		684-01	DT6S1	ST-6-01	TC-11	Output Screen Bypass
10	.05	400		484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
11	.05	400		484-05	DT4S5	ST-4-05	TC-15	" "
12	.01	600		684-01	DT6S1	ST-6-01	TC-11	Line Filter

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KAY PART No.	IRC PART No.	IDENTIFICATION CODES
13	56KΩ	½		BTS-56K	Grn.-Blue-Or. 2nd AF Cathode
14	270KΩ	1		BTA-270K	Red-Vi.-Yl. 2nd AF Plate Load
15	270KΩ	1		BTA-270K	Red-Vi.-Yl. 1st AF Plate Load
16	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. 1st AF Grid
17	2500Ω	1		BTA-2700	Red-Grn.-Red 1st AF Cathode
18	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. 2nd AF Grid
19	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Output Grid
20	20KΩ	½		BTS-22K	Red-Blk.-Or. Output Screen Dropping
21	390Ω	1		BW-1-390	Or.-White-Br. Output Cathode
22	47KΩ	1		BTA-47K	Yl.-Vi.-Or. Decoupling
23	6.8Ω	½		BW-½-6.8	Blue-Gray-Gold Series Pilot Light

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: KAY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
24	117V AC @ .44A	640V CT .04A DC	5.1V AC @ 2.0A	6.6V CT @ 1.0A	304	P-6010	T22R01	P-2950

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE @ CURRENT 1000 ~	REPLACEMENT DATA: KAY PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
25	.04A	260Ω	4 Henries	307	C-1709	T20053	C-2977*	*Drill one new mounting hole.

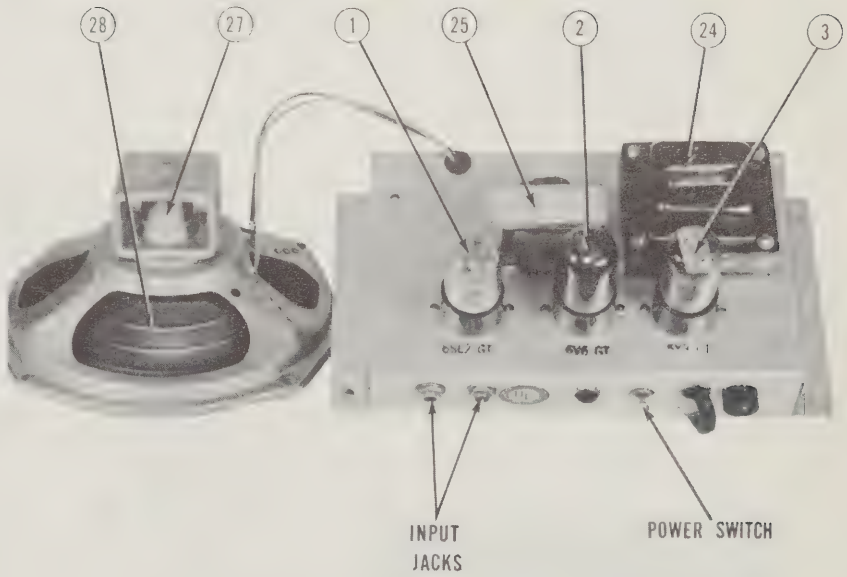
TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: KAY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
26	3300Ω	3.4Ω	285Ω	.5Ω	306	A-3823	T22887	A-2901	

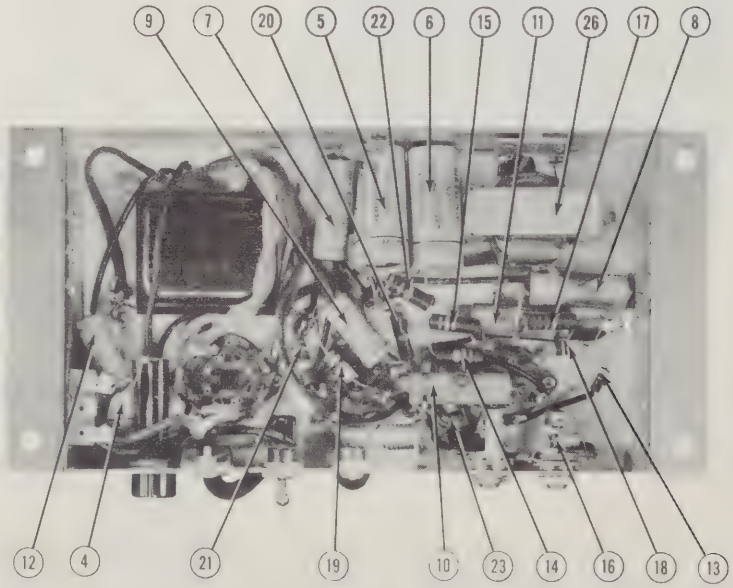
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: KAY PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
27	FIELD PM	VC IMP. 3.4Ω	1601	ST-117 Mod. P8-T	8A31	
28	CONE DIA. 7½"	VC DIA. 3/4"				

CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



KNIGHT MODEL 10B-249

TRADE NAME	Knight, Model 10B-249
SUPPLIER	Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (TEN)	Types, 6BA6 FM RF Amp., 7F8 FM Conv., 6BA6 AF RF Amp., 6BA6 FM IF Amp., 6BA6 AM-FM IF Amp., 6AU6 Limiter, 6S8GT Disc.-Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	.85 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	530-1730KC FREQ. MOD. 87.5-109MC

KNIGHT MODEL
10B-249

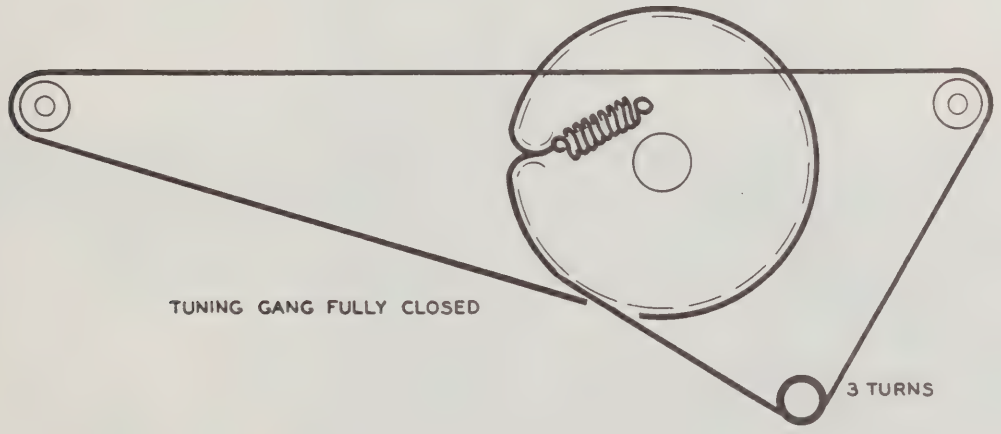
PUSHBUTTON ADJUSTMENTS

Ranges of buttons from left to right are as follows; 540-900KC, 540-900KC, 750-1320KC, 750-1320KC, 750-1320KC and 1000-1500KC.

Make up a list of stations to be set up ranging from low to high frequency making certain that each station falls within range of its button.

1. Turn set on and allow to warm up for at least 15 minutes.
2. Push in first button on left and adjust B1 to tune in station. Adjust B2 for maximum volume.
3. Check accuracy of setting by switching to AM and manually tuning in station.
4. To set up remaining buttons follow the same procedure as outlined above.

KNIGHT MODEL
10B-249



DIAL CORD DRIVE

HOWARD W. SAMS & CO., INC. Indianapolis 7, Indiana

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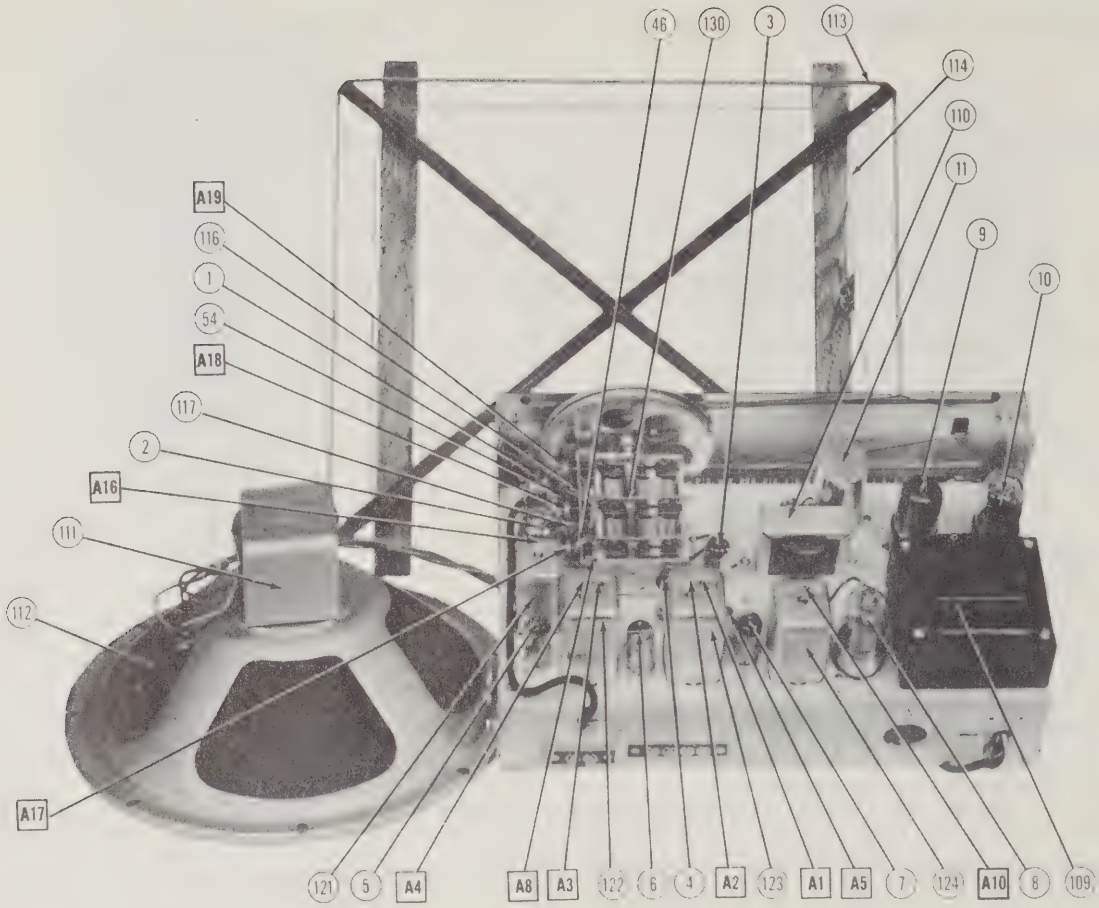
46
130
3
113
114
110
11
9
10
A19
116
1
54
A18
117
2
A16
111
112
A17
121
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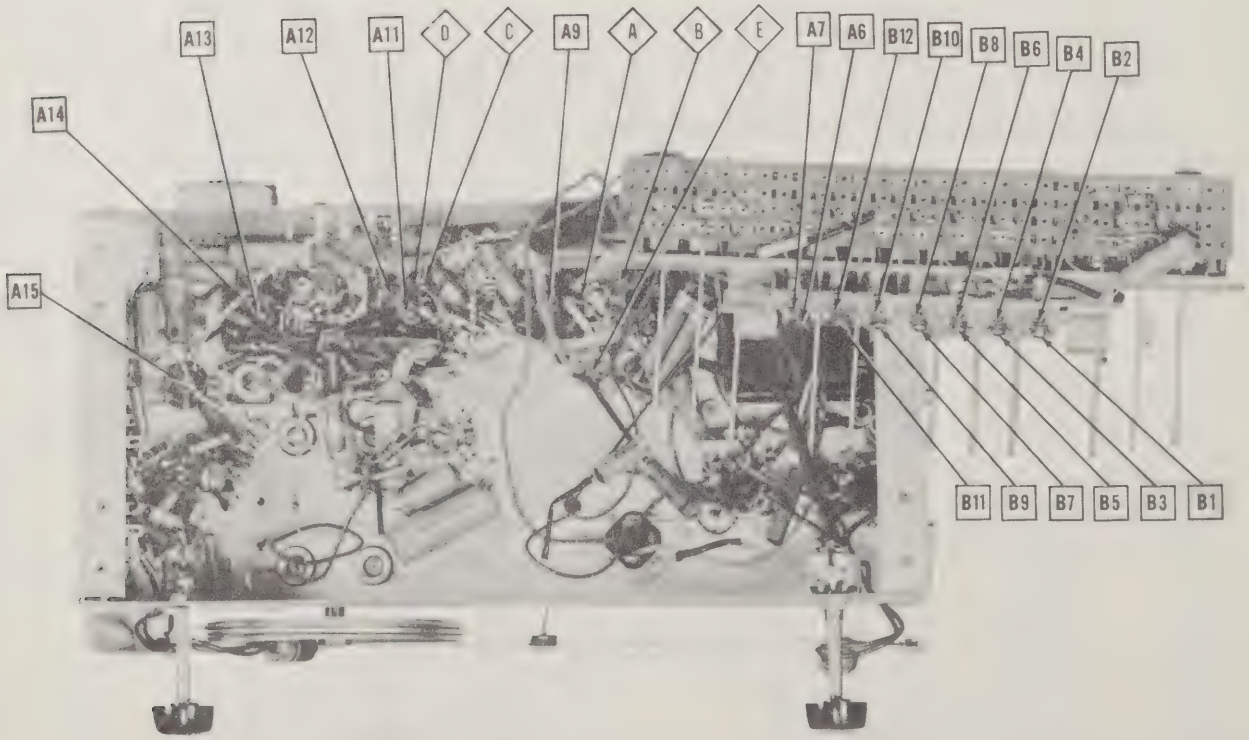
A4
A8
A3
122
6
4
A2
123
A1
A5
7
124
A10
8
109


A13
A12
A11
D
C
A9
A
B
E
A7
A6
B12
B10
B8
B6
B4
B2
A14
A15
B11
B9
B7
B5
B3
B1

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6BA6	6BA6	7BK	
2	FM Conv.	7F8	7F8	8BW	
3	AM RF Amp.	6BA6	6BA6	7BK	
4	AM Conv.	6BE6	6BE6	7CH	
5	FM IF Amp.	6BA6	6BA6	7BK	
6	AM-FM IF Amp.	6BA6	6BA6	7BK	
7	Limiter	6AU6	6AU6	7BK	
8	Disc.-Det.-AVC-AF	6S8GT	6S8GT	8CB	
9	Power Output	6V6GT	6V6GT	7AC	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11A	40	400	25E20	AF444J4A*	UP4245	DY-3x20-450*	EL-240	▲ Filter
B	20	400						▲ "
12	.01	220V AC	25E250	684-01	DT6S1	MPH-6-01	TC-11	Line Filter
13	.01	220V AC	25E250	684-01	DT6S1	MPH-6-01	TC-11	" "
14	.002	600	23E605	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
15	.001	200	23E204	484-001	DT6D1	ST-6-001	TC-21	Tone Compensation
16	.005	200	23E208	484-005	DT6D5	ST-6-005	TC-25	" "
17	.02	400	23E413	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
18	.02	200	23E213	484-02	DT4S2	ST-4-02	TC-12	" "
19	.001	600	23E204	684-001	DT6D1	ST-6-001	TC-21	De-emphasis
20	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	Limiter Plate Decoup.
21	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	Limiter Screen Bypass
22	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	IF Plate Decoup.
23	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	IF Screen Bypass
24	.05	200	23E416	484-05	DT4S5	ST-4-05	TC-15	IF Cathode
25	.05	200	23E416	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
26	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	FM IF Plate Decoup.
27	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	FM IF Screen Bypass
28	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
29	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	Conv. Plate Decoup.
30	.01	400	23E411	484-01	DT4S1	ST-4-01	TC-11	FM Conv. Cathode Bypass
31	.25	400	23E422	484-.25	DT4P25	ST-4-25	TC-2	RF Bypass Pwr. Supply
32	.05	400	23E416	484-05	DT4S1	ST-4-05	TC-15	AM Conv. Screen Bypass
33	.05	400	23E416	484-05	DT4S1	ST-4-05	TC-15	AM RF Screen Bypass
34	.2	200	23E214-10	484-.2	DT4P2	ST-4-2	TC-2	AM RF Cathode Bypass
35	.05	400	23E416	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
36	250	500	23E42	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
37	100	500	23E11	1468-0001	5W5T1	MO.5-31	1FM-31	Tone Compensation-Cer.
38	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass-Cer.
39	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
40	25	500	23E8	1468-000025	5W5Q25	MO.5-425	MS-425	Limiter Grid Filter-Cer.
41	100	500	23E11	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
42	100	500	23E11	1468-0001	5W5T1	MO.5-31	1FM-31	" " " " IF Grid Bypass-Cer.
43	3	500	23E13					Fixed Trimmer-See Note-Cer.
44	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	AVC Filter-Cer.
45	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	Conv. Cathode Byp.-Cer.
46	3	500	23E13					Fixed Trimmer-See Note-Cer.
47	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	Osc. Plate Bypass-Cer.
48	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
49	3	500	23E13					Osc. Coupling-Cer.
50	25	500	23E8	1468-000025	5W5Q25	MO.5-425	MS-425	RF Coupling-Cer.
51	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	FM RF Plate Decoup.-Cer.
52	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	FM RF Screen Byp.-Cer.
53	1000	500	23E2012	1468-001	1W5D1	MO.5-21	1FM-21	FM RF Cathode Byp.-Cer.
54	100	500	23E11	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
55	100	500	23E11	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
56	250	500	23E42	1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling
57	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer-Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: KNIGHT PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
109	117V AC @ .85A	680V CT .114A DC	5.0V AC @ 2.0A	6.4V AC @ 3.6A	22E19	P-6013	T22R05	P-2953

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: KNIGHT PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
110	4300Ω	3.9Ω	290Ω	.4Ω	22E18	A-3825	T22S60	A2902‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: KNIGHT PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
111	FIELD 1000Ω	VC IMP. 3.9Ω	1E24	ST-744 Mod. F12-S	12E10†	†Replace output transformer to match 6-8Ω voice coil.
112	CONE DIA. 11½"	VC DIA. 1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: KNIGHT PART No.	MEISSNER PART No.
113	Loop Ant.		.3Ω	20E235	
114	FM Dipole			20E269	
115	Loop Load. Coil		1.5Ω	20E222	
116	FM Ant.Coil		0Ω	2E48	
117	FM RF Coil		0Ω	2E49	
118	Wave Trap		55Ω	2E19	
119	BC Osc.Coil	.7Ω	5.7Ω	20E221	14-1060
120	FM Osc. "		0Ω	2E50	
121	FM 1st IF	.3Ω	.3Ω	20E218	
122A	AM 1st IF	4Ω	4.5Ω	20E216	
B	FM 2nd IF	.4Ω	.4Ω		
123A	AM 2nd IF	7Ω	7Ω	20E217	
B	FM 3rd IF	.4Ω	.4Ω		
124	FM Disc.	.4Ω	.4Ω	20E219	
125	FM Plate Choke		.1Ω	2E52	
126	RF Choke		.2Ω	2E47	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: KNIGHT PART No.		INSTALLATION NOTES
127	Bayonet	6-8	0.25	Blue	40E2		Type 44
128	"	"	"	"	"		" "

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
129	Switch	29E14	Pushbutton
130	Tuning Gang	24E27	AM (15-518MMF, 15-518MMF)
A5	Trimmer	24E3	AM Wave Trap Adj.
A8	Padder	24E16	AM Osc. Adj.
	Trimmer Strip	24E26	A6, B1, B3, B5, B7, B9, B11
	"	24E25	A7, B2, B4, B6, B8, B10, B12
A17	Trimmer	24E28	FM Osc. Adj.
A18	"	24E28	FM RF Adj.
A19	"	24E28	FM Ant. Adj.
	Dial Pointer	20E174-4	
	Dial Scale	36E29-2	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
58	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	Fixed Trimmer-Cer.
59	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
60	51	500	23E2	1468-00005	5W5Q5	MO.5-45	1FM-45	" " "

*-Parallel sections to obtain desired capacity.
Note-Not used in all models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	
61A	2 Meg.		28E21	D18-139X	AT-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	E	KSS-3	Attach to 61A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	
62	1 Meg.	½	27E106-2	BTS-1 Meg.	Br.-Blk.-Grn. FM RF Grid
63	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. AVC Network
64	68Ω	½	27E680-2		Blue-Gray-Blk. FM RF Cathode
65	39KΩ	½	27E393-2	BTS-39K	Or.-White-Or. FM RF Screen Dropping
66	2200Ω	½	27E222-2	BTS-2200	Red-Red-Red FM RF Plate Decoupling
67	68Ω	½	27E680-2	BW-2-68	Blue-Gray-Blk. AM RF Cathode
68	39KΩ	½	27E393-2	BTS-39K	Or.-White-Or. AM RF Screen Dropping
69	8200Ω	1	27E822-3	BTA-8200	Gray-Red-Red AM RF Plate Load
70	1 Meg.	½	27E105-2	BTS-1 Meg.	Br.-Blk.-Grn. AM Converter Grid
71	22KΩ	½	27E223-2	BTS-22K	Red-Red-Or. AM Oscillator Grid
72	1000Ω	½	27E102-2	BTS-1000	Br.-Blk.-Red Parasitic Suppressor
73	2.2 Meg.	½	27E225-2	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
74	22KΩ	2	27E223-5	BT-2-22K	Red-Red-Or. AM Converter Screen Dropping
75	2200Ω	½	27E222-2	BTS-2200	Red-Red-Red FM Converter Plate Decoupling
76	22KΩ	½	27E223-2	BTS-22K	Red-Red-Or. FM Oscillator Grid
77	10KΩ	1	27E103-3	BTA-10K	Br.-Blk.-Or. FM Oscillator Plate Load
78	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. AVC Network
79	1500Ω	½	27E152-2	BTS-1500	Br.-Grn.-Red FM Converter Cathode
80	47Ω	½	27E470-2		Yl.-Vi.-Blk. 1st IF Cathode
81	39KΩ	½	27E393-2	BTS-39K	Or.-White-Or. 1st IF Screen Dropping
82	2200Ω	½	27E222-2	BTS-2200	Red-Red-Red 1st IF Plate Decoupling
83	68Ω	½	27E680-2		Blue-Gray-Blk. 2nd IF Cathode
84	39KΩ	½	27E393-2	BTS-39K	Or.-White-Or. 2nd IF Screen Dropping
85	2200Ω	½	27E222-2	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
86	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. 3rd FM IF Transformer Shunt
87	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. 3rd FM IF Transformer Shunt
88	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. Limiter Grid
89	1 Meg.	½	27E105-2	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
90	15KΩ	½	27E153-2	BTS-15K	Br.-Grn.-Or. Bleeder
91	43KΩ	1	27E473-3	BTA-47K	Yl.-Or.-Or. Limiter Screen Dropping
92	1 Meg.	½	27E105-2	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
93	47KΩ	½	27E473-2	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
94	330KΩ	½	27E334-2	BTS-330K	Or.-Or.-Yl. Diode Load
95	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. Limiter Plate Decoupling
96	470KΩ	½	27E474-2	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
97	82KΩ	½	27E823-2	BTS-82K	Gray-Red-Or. De-emphasis
98	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
99	100KΩ	½	27E104-2	BTS-100K	Br.-Blk.-Yl. " " "
100	10 Meg.	½	27E106-2	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
101	220KΩ	½	27E224-2	BTS-220K	Red-Red-Yl. AF Plate Load
102	47KΩ	½	27E473-2	BTS-47K	Yl.-Vi.-Or. Tone Compensation
103	220KΩ	½	27E224-2	BTS-220K	Red-Red-Yl. " "
104	220KΩ	½	27E224-2	BTS-220K	Red-Red-Yl. " "
105	470KΩ	½	27E474-2	BTS-470K	Yl.-Vi.-Yl. Output Grid
106	270Ω	1	27E271-3	BW-1-270	Red-Vi.-Br. Output Cathode
107	100KΩ	2	27E104-5	BT-2-100K	Br.-Blk.-Yl. Bleeder
108	100KΩ	2	27E104-5	BT-2-100K	Br.-Blk.-Yl. "

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡	1	6BA6	0V.	0V.	6.4VAC	0V.	225VDC	115VDC	1VDC	-	-
‡	2	7F8	0V.	6.2VAC	240VDC	5.5VDC	0V.	162VDC	0V.	-1.5VDC§	-
	3	6BA6	0V.	0V.	6.4VAC	0V.	182VDC	98VDC	.9VDC	-	-
	4	6BE6	-11VDC§	0V.	6.4VAC	0V.	260VDC	82VDC	0V.	-	-
‡	5	6BA6	-.2VDC	0V.	6.4VAC	0V.	232VDC	100VDC	.5VDC	-	-
	6	6BA6	-.2VDC	0V.	6.4VAC	0V.	230VDC	110VDC	1VDC	-	-
‡	7	6AU6	-.3VDC	0V.	6.4VAC	0V.	35VDC	52VDC	0V.	-	-
	8	6S8GT	-.6VDC	0V.	-.6VDC	-.6VDC	-.2VDC	117VDC	6.4VAC	0V.	-.6VDC
	9	6V6GT	0V.	0V.	240VDC	250VDC	0V.	0V.	6.4VAC	22VDC	-
	10	5Y3GT	0V.	350VDC	0V.	340VAC	0V.	340VAC	0V.	350VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡	1	6BA6	1.5 Meg.	0Ω	.1Ω	0Ω	25KΩ	55KΩ	68Ω	-	-
‡	2	7F8	0Ω	.3Ω	25KΩ	1.5KΩ	0Ω	30KΩ	0Ω	22KΩ	-
	3	6BA6	550KΩ	0Ω	.1Ω	0Ω	28KΩ	60KΩ	68Ω	-	-
	4	6BE6	22KΩ	.7Ω	.1Ω	0Ω	20KΩ	40KΩ	1 Meg.	-	-
‡	5	6BA6	550KΩ	0Ω	.1Ω	0Ω	22KΩ	60KΩ	47Ω	-	-
	6	6BA6	550KΩ	0Ω	.1Ω	0Ω	22KΩ	60KΩ	68Ω	-	-
‡	7	6AU6	100KΩ	0Ω	.1Ω	0Ω	120KΩ	15KΩ	0Ω	-	-
	8	6S8GT	300KΩ	0Ω	175KΩ	175KΩ	200KΩ	240KΩ	.1Ω	0Ω	10 Meg.
	9	6V6GT	0Ω	0Ω	20KΩ	20KΩ	470KΩ	INF.	.1Ω	270Ω	-
	10	5Y3GT	INF.	20KΩ	INF.	90Ω	INF.	85Ω	INF.	20KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

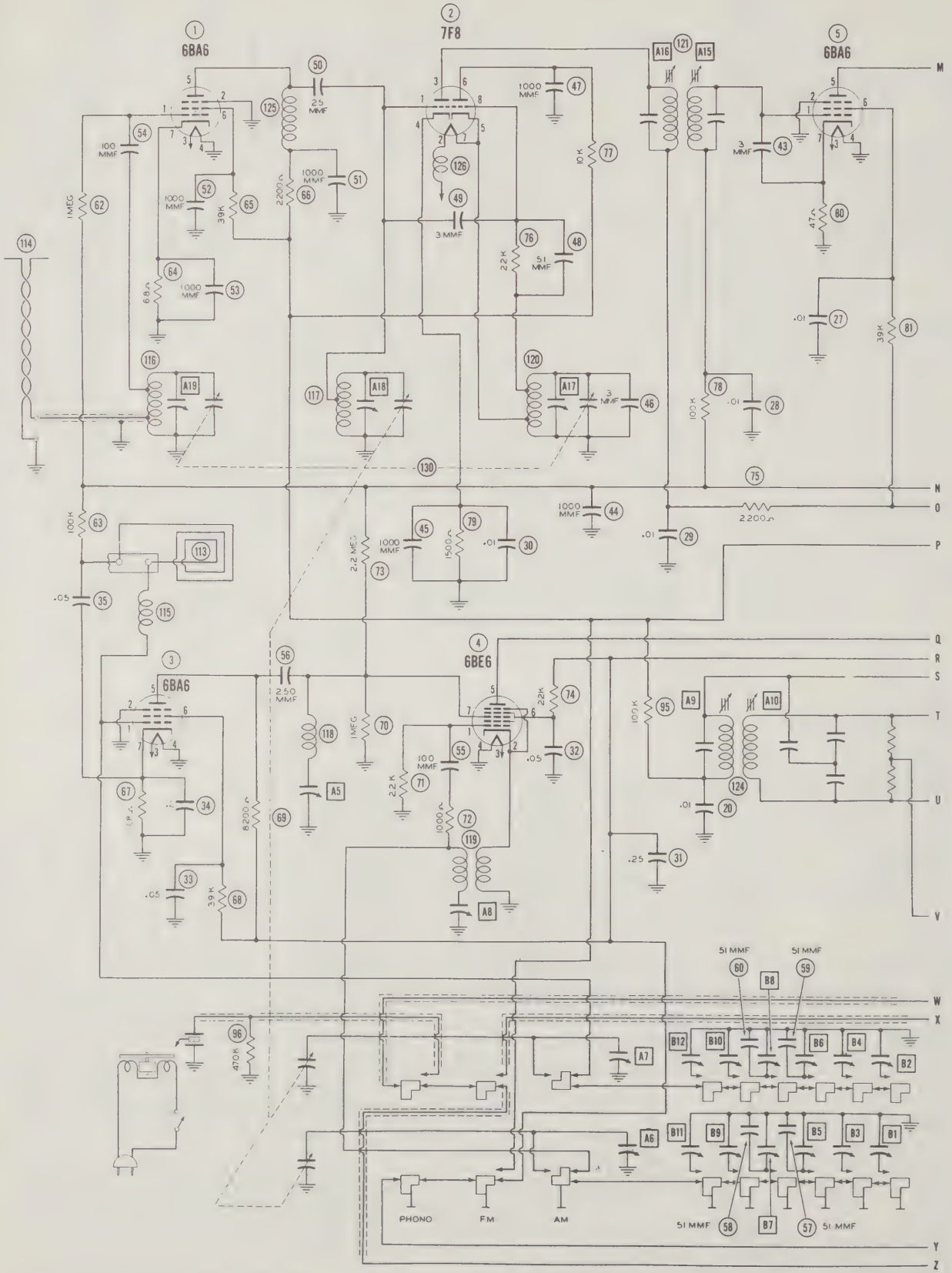
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS

RF GRID TO CONV. GRID	15X	600KC	IF TUBE	140X	455KC
CONV. GAIN	6X	IN 600KC	2nd IF TRANSFORMER	.5X	455KC
		OUT 455KC	AUDIO	50X	400 ∿
1st IF TRANSFORMER	.75X	455KC	OUTPUT	10X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

DATE 7/48-#4812-14 SET #42-FOLDER #14



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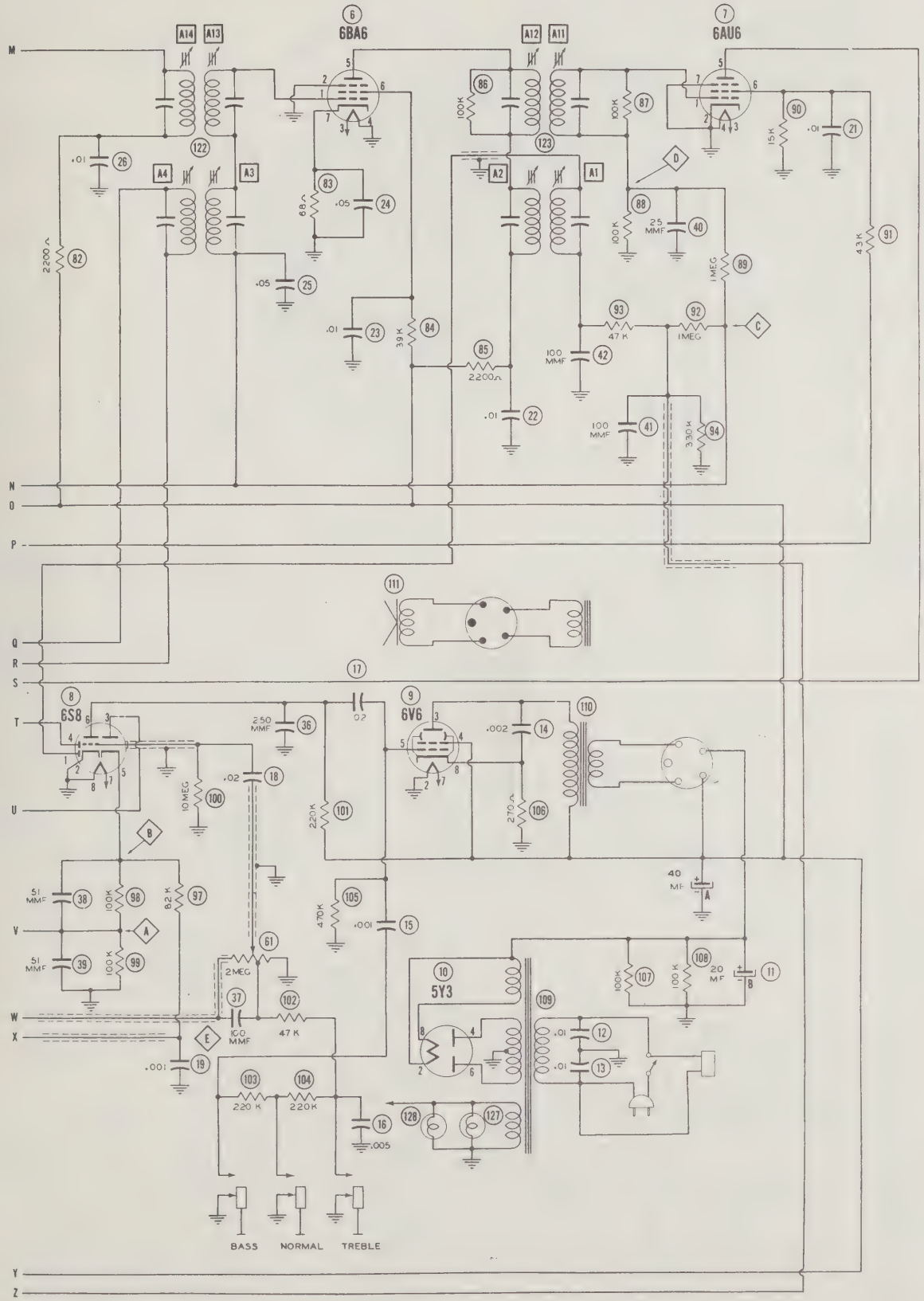

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-14

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

AM IF adjustments should be made before any of the FM IF adjustments. After FM IF alignment is completed AM IF's should be rechecked.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.2 MFD.	High side to rear stator of tuning cap. Low side to chassis. (Loop must be connected)	455KC	BC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	250MMFD	High side to terminal #1. Low side to terminal #2 of loop ant. terminal strip.	"	"	Tuning cap. fully closed	"	A5	Adjust for minimum output
3	250MMFD	"	1730KC	"	Tuning cap. fully open.	"	A6	Adjust for maximum output
4		Loop	1400KC	"	Tune for maximum output.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5		"	600KC	"	"	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Once FM IF Alignment is completed recheck AM IF Alignment.
In Step 7 tune sig. gen. above 10.7 for maximum reading and note meter reading and frequency at which this reading occurs. Tune sig. gen. below 10.7MC for maximum meter reading and note frequency and meter reading. One reading should not be less than 70% of the other. The difference between the center frequency and one peak should not exceed the difference between the center frequency and the other peak by more than 50KC.
In Step 8 attenuate sig. gen. for meter reading of 2 volts at 10.7MC. Tune sig. gen. above 10.7MC until meter reads 1 volt and note frequency at which this occurs. Tune sig. gen. below 10.7MC until meter reads 1 volt and note this frequency reading. The two freq. readings should be uniformly spaced either side of 10.7MC. The difference in KC between the two freq. readings should be at least 200KC.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	.002MFD	High side to Pin 1 (grid) 6AU6. Low side to chassis.	10.7MC (400 ∿ Amp. Mod.)	FM	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to chassis	A9	Adjust for maximum deflection.
7	.002MFD	"	"	"	"	DC probe to Point Ⓑ. Common to chassis	A10	Adjust for minimum audio output and zero deflection on VTVM. These should occur at same point. It may be necessary to repeat Step 6 to make these two occur simultaneously. Check band pass per prealignment notes.
8	.002MFD.	High side to Pin 1 (grid) 7F8. Low side to chassis.	"	"	"	DC probe to Point Ⓒ. Common to chassis	A11,A12 A13,A14 A15,A16	Adjust for maximum deflection. Attenuate output of sig. gen. to maintain maximum meter deflection of 2 volts. Check band pass per prealignment notes. Continue with FM RF Alignment.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 60 ∿ modulation with 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.
When FM IF alignment is completed recheck AM IF adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (5). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point Ⓓ. Ground to chassis.	A11,A12 A13,A14	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.01 MFD	High side to Pin 1 (grid) 7F8. Low side to chassis.	"	"	"	"	A15,A16	"
8	.01 MFD	"	"	"	"	Vertical input to Point Ⓔ. Ground to chassis.	A9,A10	Alternately adjust A9 for maximum amplitude & A10 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM RF Alignment.

FM RF ALIGNMENT

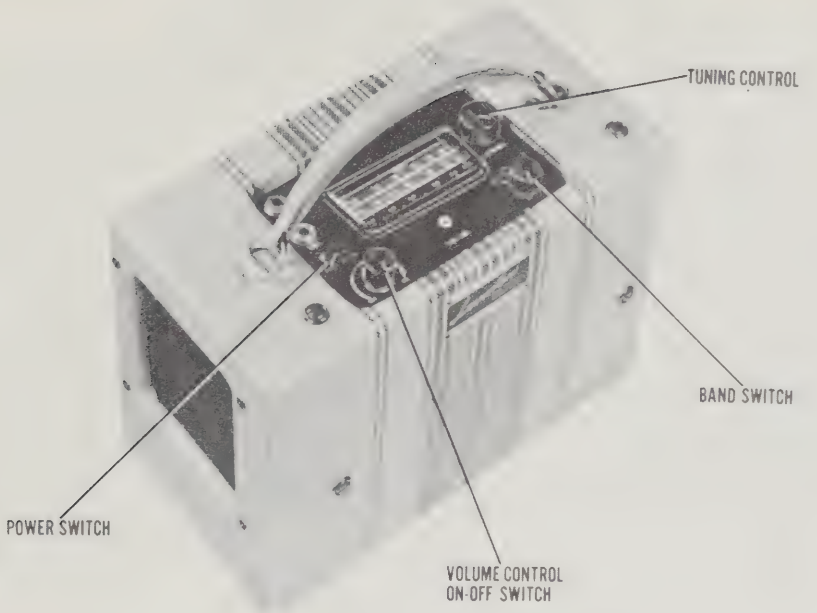
Turn tuning cap. fully closed and mark position of pointer. This is the index mark referred to in Step 9 below.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
9	300Ω carbon res.	High side to FM ant. terminal. Low side to chassis.	108MC (Unmodulated)	FM	6-17/32" from index mark.	DC probe Point Ⓒ. Common to chassis.	A17	Adjust for maximum deflection.
10	"	"	104MC	"	Tune for maximum deflection.	"	A18,A19	Rock tuning cap. and adjust for maximum deflection.

FIG. 1

FIG. 2

LEARADIO MODEL RM-402C (LEARAVIAN)
BATTERY-LINE OPERATED



LEARADIO MODEL RM-402C (LEARAVIAN)

TRADE NAME	Learadio, Model RM-402C (Learavian)
MANUFACTURER	Lear, Inc., 110 Ionia Ave., N.W., Grand Rapids, Mich.
TYPE SET	Three Power Operated Portable Beacon-Broadcast-Communication Superhet. Receiver
TUBES (SEVEN)	Types, 1N5GT RF Amp., 1A7GT Converter, 1N5GT IF Amp., 1H5GT Det.-AVC-AF, 1A5GT Power Output, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY RATING	105-125 Volts AC-DC or 7.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .33 Amp. @ 117 Volts AC or 55MA @ 7.5 Volts DC and 8.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1560KC SHORT WAVE 2.2MC-6.2MC LONG WAVE 195KC-410KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to 2.2MC calibration mark.
Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to grid cap. of 1A7. Low side to shell of antenna socket.	455KC	Band 2	Tuning cap. fully closed	Across phone jack terminals	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF. to reduce hum modulation.
2	20MMFD	High side to ant. socket. Low side to shell of ant. socket.	400KC	Band 1	400KC	"	A5	Adjust for maximum output
3	20MMFD	"	"	"	Tune for maximum output.	"	A6,A7	" " " "
4	20MMFD	"	220KC	"	"	"	A8	Rock tuning cap. and adjust A8 for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made, making Step 3 last step.
5	20MMFD	"	1400KC	Band 2	1400KC	"	A9	Adjust for maximum output
6	20MMFD	"	"	"	Tune for maximum output.	"	A10	" " " "
7	20MMFD	"	600KC	"	"	"	A11	Rock tuning cap. and adjust A11 for maximum output. Repeat Steps 5, 6 & 7 until no further improvement can be made.
8	20MMFD	"	6MC	Band 3	6MC	"	A12	Adjust for maximum output.
9	20MMFD	"	"	"	Tune for max. output.	"	A13, A14, A15	Rock tuning cap. and adjust A13, A14 & A15 for maximum output.

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PARTS LIST AND DESCRIPTIONS

LEARADIO MODEL RM-4C2C (LEARAVIAN)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: LEAR PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	1N5GT	1N5GT	5Y	
2	Converter	1A7GT	1A7GT	7Z	
3	1st IF Amp.	1N5GT	1N5GT	5Y	
4	Det.-AVC-AF	1H5GT	1H5GT	5Z	
5	Power Output	1A6GT	1A6GT	6X	Battery operation only.
6	" "	50L6	50L6	7EZ	AC-DC Operation only.
7	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: LEAR PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
A	50	150	53728	AF106D20A	UP6CJ64	DY-306*	EL-351	■ Filter
B	30	150						▲ "
C	200	6				M-100-12		Filament Bypass
9	200	10	54057	PRS25/100	BRH1225	M-250-12	UHC-212	" "
10	20	25	60003	PRS25/25	BR202A	M-25-25	TA-25	Cathode Bypass
11	.05	400	56628	484-05	DT4S5	ST-4-05	TC-15	Line Filter
12	.005	400	56618	484-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
13	.002	600	56614	684-002	DT6D2	ST-6-002	TC-22	" " "
14	.01	400	56622	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
15	.01	400	56622	484-01	DT4S1	ST-4-01	TC-11	" "
16	.1	200	56603	484-.1	DT2P1	ST-2-1	TC-1	AF Plate Decoupling
17	.002	600	56614	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
18	.05	200	56600	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
19	.1	200	56603	484-.1	DT2P1	ST-2-1	TC-1	Conv. Screen Bypass
20	.05	200	56600	484-05	DT2S5	ST-2-05	TC-15	RF Bypass Pwr. Supply
21	.01	200		484-01	DT2S1	ST-4-01	TC-11	Ant. Jack Isolation
22	.1	200	56603	484-.1	DT2P1	ST-2-1	TC-1	Filament Bypass
23	.1	200	56603	484-.1	DT2P1	ST-2-1	TC-1	" "
24	100	500	56057	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
25	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	Microphone Coupling
26	100	500	56057	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
27	100	500	56057	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
28	1600	300	53844					Fixed Pad
29	20	300	2189		5R5Q2	MOS.5-42	MS-42	Fixed Trimmer-Cer.
30	20	300	2189		5R5Q2	MOS.5-42	MS-42	" " "
31	100	500	56057	1469-0001	5R5T1	MOS.5-31	MS-31	" "
32	100	500	56057	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
33	220	500	56059	1468-00025	5W5T25	MO.5-325	1FM-325	Ext. Ant. Coupling

*Parallel sections to obtain desired capacity.

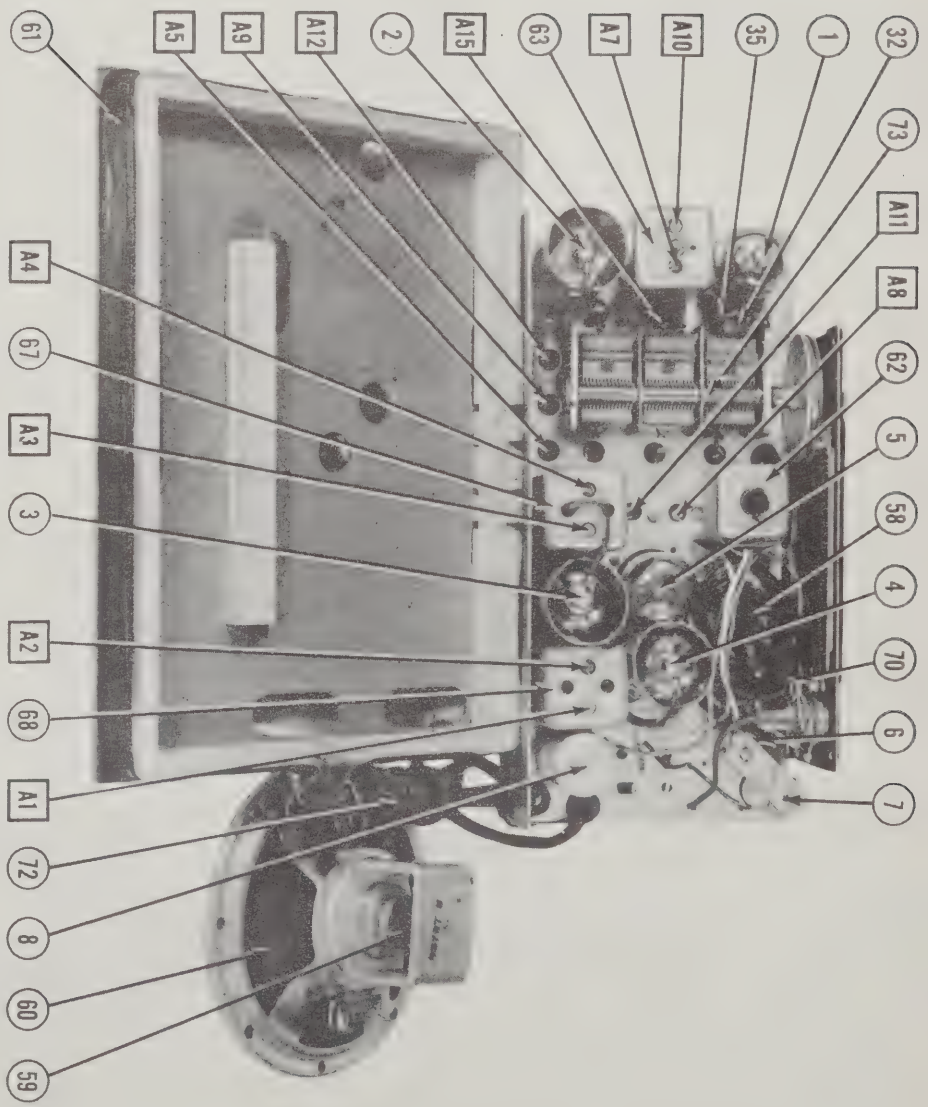
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: LEAR PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
34	1 Meg.	½	55489			Volume Control & Switch

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: LEAR PART No.	IRC PART No.	IDENTIFICATION CODES
35	1 Meg.	½	55489	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
36	220KΩ	½	55485	BTS-220K	Red-Red-Yl. Oscillator Grid
37	68KΩ	½	55482	BTS-68K	Blue-Gray-Or. Screen Dropping
38	10KΩ	½	55477	BTS-10K	Br.-Blk.-Or. Oscillator Coil Shunt
39	100KΩ	½	55483	BTS-100K	Br.-Blk.-Yl. Series Volume Control
40	3.3 Meg.	½	55492	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
41	3.3 Meg.	½	55492	BTS-3.3 Meg.	Or.-Or.-Grn. " "
42	47KΩ	½	55481	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
43	1 Meg.	½	55489	BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
44	4.7 Meg.	½	55493	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
45	470KΩ	½	55487	BTS-470K	Yl.-Vi.-Yl. Tone Compensation
46	220KΩ	½	55485	BTS-220K	Red-Red-Yl. AF Plate Load
47	100KΩ	½	55483	BTS-100K	Br.-Blk.-Yl. AF Plate Decoupling
48	3.3 Meg.	½	55492	BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
49	1 Meg.	½	55489	BTS-1 Meg.	Br.-Blk.-Grn. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	LEAR PART No.	IRC PART No.	
50	200Ω	½	55398	BW-½-180	Red-Blk.-Br. Output Cathode
51	27Ω	½	55388	BW-½-27	Red-Vi.-Blk. Surge Limiter
52	470Ω	2	55935	BT-2-470	Yl.-Vi.-Br. Filter
53	19000Ω	10	2312	AB-2000	Filament Dropping
54	1200Ω	½	55408	BTS-1200	Br.-Red-Red Filament String
55	1200Ω	½	55408	BTS-1200	Br.-Red-Red Microhpone Bias
56	3.3 Meg.	½	55492	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
57	270Ω	1		BW-1-270	Red-Vi.-Br. Filament String-See Note

Note-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		LEAR PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
58	17,600Ω tapped @ 2350Ω	3.2Ω	1000Ω tapped @ 260Ω	24Ω tapped @ 1.5Ω	53733				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			LEAR PART No.	JENSEN PART No.	QUAM PART No.	
59	FIELD PM	VC IMP. 3.2Ω	63727-8	ST-107 Mod. P5-V	5A15	
60	CONE DIA. 4-3/4"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	LEAR PART No.	MEISSNER PART No.	
61	Ant. Loop		14.8Ω	53711		
62A	BC Loop Load. Coil		6.7Ω	53771		
B	SW Ant. Coil	14Ω	.8Ω			
63A	RF Coil LW	234Ω	34Ω	53740		
B	" " BC	157Ω	7Ω			
64	RF Coil SW	18Ω	.6Ω	50160		
65A	Osc. Coil LW	6.8Ω	4.7Ω	53739		
B	" " BC	3.8Ω	1.8Ω			
66	Osc.Coil SW	1.2Ω	.5Ω	50236		
67	1st IF	12.5Ω	18Ω	53730	16-6658	
68	2nd IF	12.5Ω	18Ω	53729	16-6660	

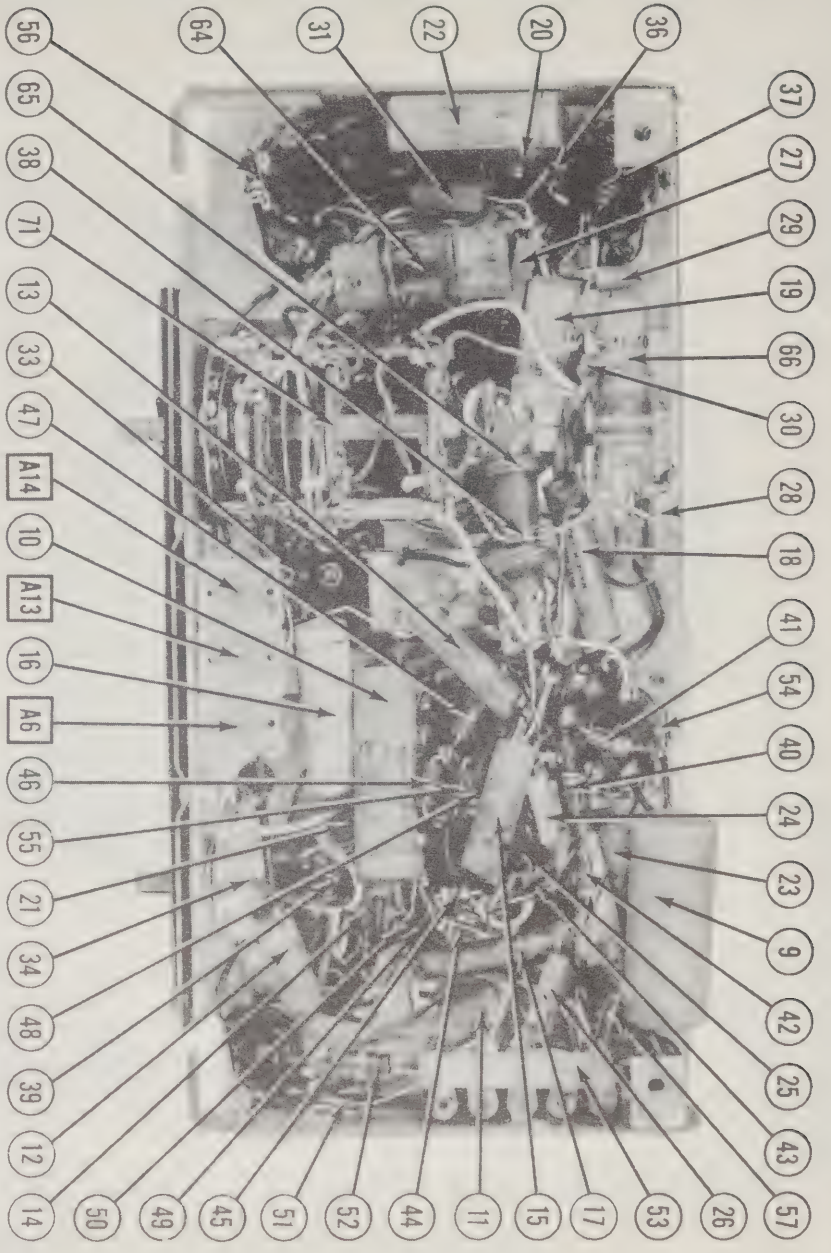
BATTERIES

ITEM No.	VOLTAGE	LEAR PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
69	7.5V "A" 90V "B"	53766			#753			F6A60	

MISCELLANEOUS

ITEM No.	PART NAME	LEAR PART No.	NOTES
70	Switch	50230	AC/DC-Batt.
71	"	53764	Band
72	Line Cord	54935	Resistive
73	3 Gang Var. Cap	54070	(15-450MMF) each section
A5	Trimmer Strip	53157	Long Wave Osc. Adj.
A9			Broadcast " "
A12			Short Wave " "
A6	Trimmer Strip	53734	Long Wave Ant. Adj.
A13			Short Wave " "
A8	Padder	53713	Long Wave Osc. Adj.
A11	"	53713	Broadcast " "
A15	Trimmer	56748	Short Wave RF Adj.
	Knob	53742	Tuning
	"	53741	Volume & Switch

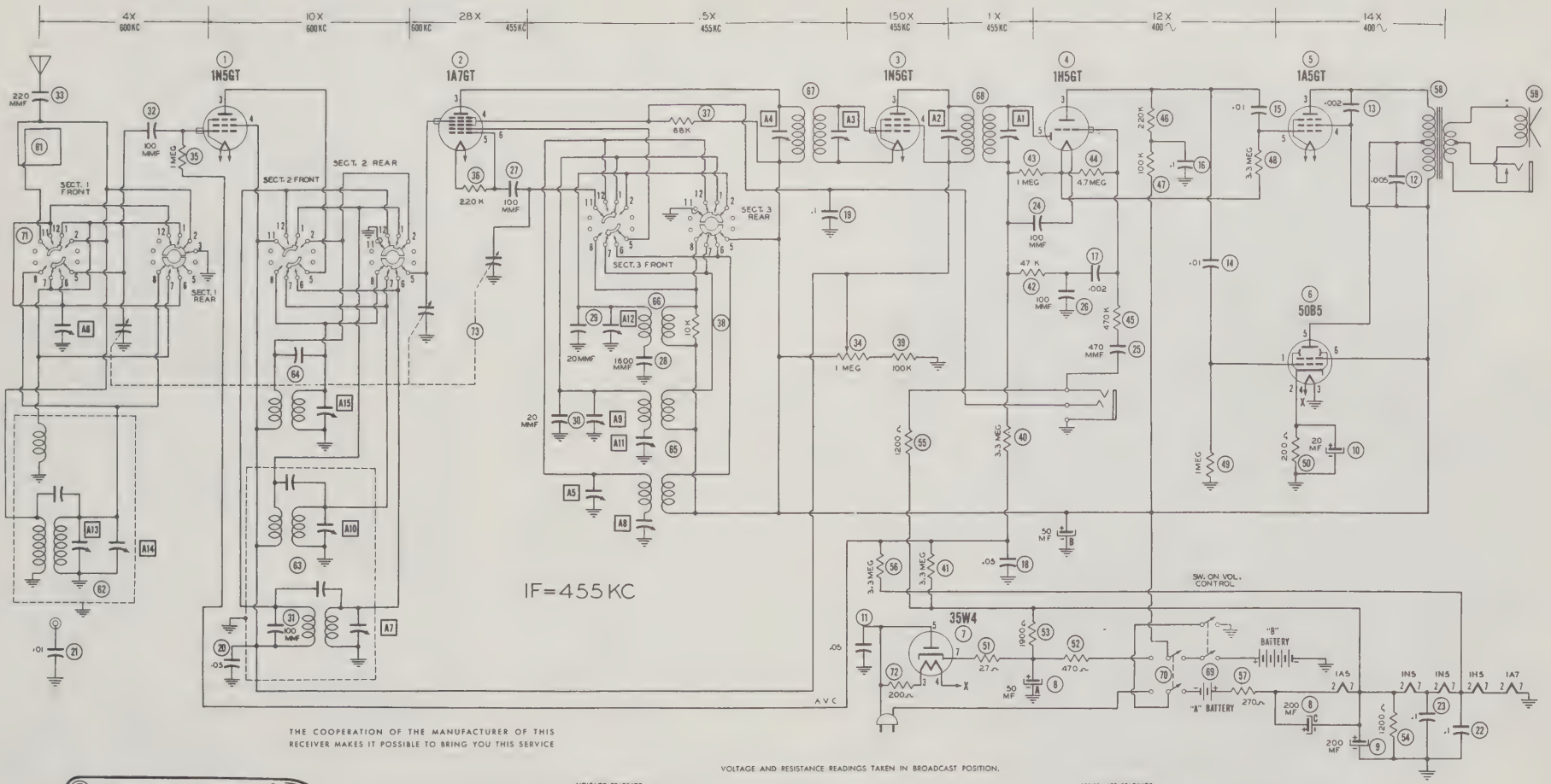
CHASSIS—BOTTOM VIEW



DATE 7/48-#4612-15 SET #42-FOLDER

LEARADIO MODEL RM-402C (LEARAVIAN)

LEARADIO MODEL RM-402C (LEARAVIAN)



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1N5GT	-.V.	4.4VDC	90VDC	90VDC	90VDC	0V.	3VDC	.6VDC	.2VDC
2	1A7GT	-.V.	1.3VDC	90VDC	45VDC	-12VDC§	90KΩ	0V.	90VDC	0V.
3	1N5GT	0V.	5.4VDC	90VDC	90VDC	3VDC	.5VDC	4.4VDC	90VDC	4.4VDC
4	1H5GT	0V.	.3VDC	68VDC	5.8VDC	.4VDC	0V.	1.5VDC	0V.	0V.
‡‡ 5	1A5GT	0V.	6VDC	80VDC	82VDC	0V.	0V.	7.2VDC	77VDC	-
6	50B5	0V.	7.2VDC	50VAC	0V.	80VDC	90VDC	0V.	-	-
7	35W4	0V.	90VDC	85VAC	50VAC	117VAC	57VAC	115VDC	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1N5GT	0Ω	*	.2MΩ	.2MΩ	.2MΩ	1MΩ	*	1 Meg.	.2MΩ
2	1A7GT	0Ω	*	.1MΩ	1 Meg.	.2MΩ	.2MΩ	*	.2MΩ	.1MΩ
3	1N5GT	0Ω	*	.2MΩ	.2MΩ	*	1.1 Meg.	*	.2MΩ	*
4	1H5GT	0Ω	*	320KΩ	1.2KΩ	1 Meg.	.1 Meg.	*	4.7 Meg.	4.7 Meg.
‡‡ 5	1A5GT	0Ω	*	150KΩ	150KΩ	3.3 Meg.	1MΩ	*	250 KΩ	-
6	50B5	1 Meg.	200Ω	53Ω	0Ω	2.5KΩ	2.2KΩ	1 Meg.	-	-
7	35W4	INF.	2KΩ	85Ω	53Ω	300Ω	82Ω	2KΩ	-	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

‡‡VOLTAGE AND RESISTANCE READINGS TAKEN IN BATTERY POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-15

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting low side of secondary on output IF shorted to Pin 7 of 1A5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

LEWYT MODEL 711
BATTERY-LINE OPERATED

LEWYT MODEL 711
BATTERY-LINE OPERATED

LEWYT MODEL 711

TRADE NAME	Lewyt, Model 711
MANUFACTURER	Lewyt Corp., 60 Broadway, Brooklyn 11, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply
RATING	.18 Amp. @ 117 Volts AC or 50MA @ 9 Volts DC and 11.9MA @ 90 Volts DC
TUNING RANGE—BROADCAST	550-1670KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are five reference marks on dial backplate. These are in order from upper right hand corner to upper left hand corner. Low frequency end limit, 600KC, 1000KC, 1500KC and high freq. end limit. To set pointer turn tuning cap. fully closed and set pointer to low frequency end limit.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMFD to reduce hum modulation.
2		Loop	1500KC	1500KC reference mark	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 7, Indiana

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DATE 7/48-#4812-16 SET #42-FOLDER #16

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		LEWYT PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	LEWYT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	40	150	W-354	AF88D	UP44415	DY-3x40-150	EL-340	■ Filter
B	40	150		PRS150/40				A "
C	40	150						"
6A	25	25	W-353	PRSA150/30-30	BRD202A	M-3x10-25	TA-330	Filament Bypass
B	25	25						" "
7	.05	200		484-05	DT2S5	ST-4-05	TC-15	Line Filter
8	.003	200		484-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
9	.01	200		484-01	DT2S1	ST-2-01	TC-11	Audio Coupling
10	.01	200		484-01	DT2S1	ST-2-01	TC-11	AF Screen Bypass
11	.01	200		484-01	DT2S1	ST-2-01	TC-11	Audio Coupling
12	.05	200		484-05	DT2S5	ST-2-05	TC-15	AVC Filter
13	.05	200		484-05	DT2S5	ST-2-05	TC-15	Screen Bypass
14	.05	200		484-05	DT2S5	ST-2-05	TC-15	Filament Bypass
15	.5	200		484-.5	DT2P5	ST-2-5	TC-5	AF Screen Decoupling
16	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
17	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
18	10	500		1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer
19	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

CONTROLS

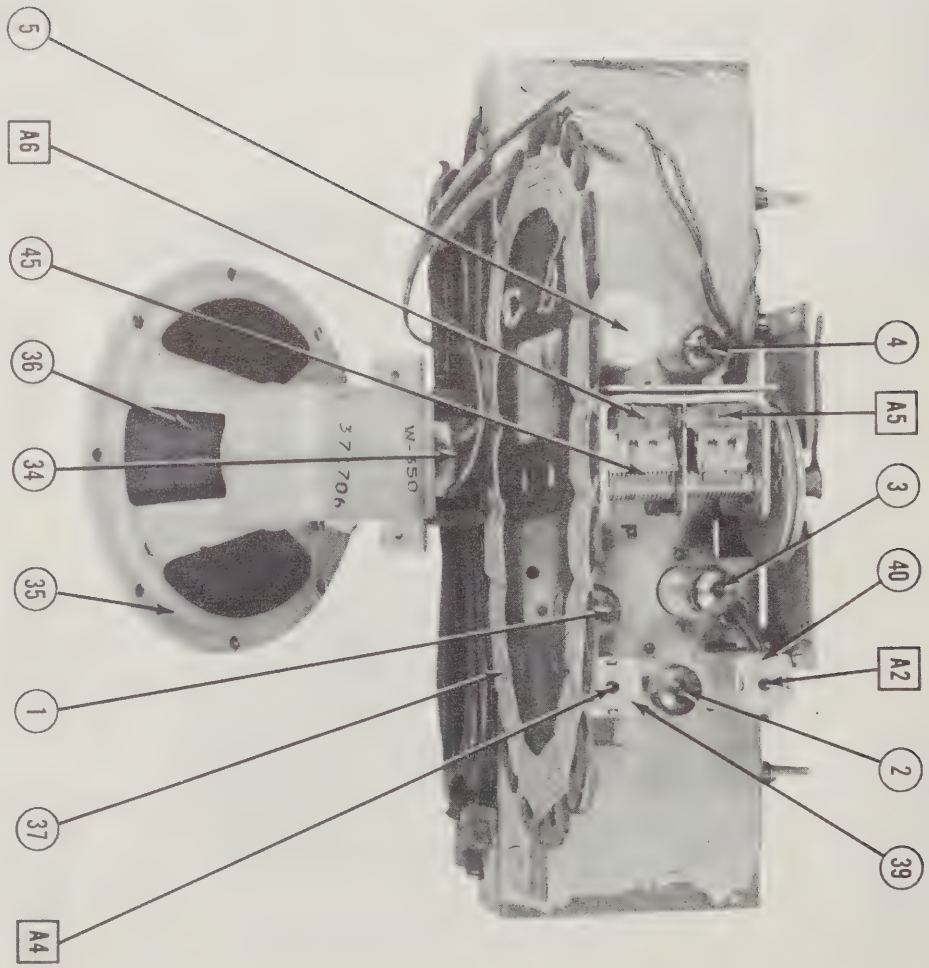
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	LEWYT PART No.	IRC PART No.	CLAROSTAT PART No.	
20A	1 Meg.	½	W342	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 20A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	LEWYT PART No.	IRC PART No.	
21	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Oscillator Grid-See Note 1
22	6800Ω	½		BTS-6800	Blue-Gray-Red Screen Dropping
23	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
24	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
25	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
26	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen Dropping
27	820KΩ	½		BTS-820K	Gray-Red-Yl. AF Plate Load
28	47KΩ	½		BTS-47K	Yl.-Vi.-Or. AF Plate Decoupling-See Note 2
29	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
30	30Ω	½		BW-½-33	Or.-Blk.-Blk. Series Filament
31	680Ω	½		BTS-680	Blue-Red-Br. Filament String
32	220Ω	½		BW-½-220	Red-Red-Br. " "
33A	50Ω	½	W-346	AB-50	Surge Limiter
B	275Ω			ABA-275	Filter-See Note 3
C	275Ω			ABA-275	" " " "
D	1350Ω			ABA-1450	Filament Dropping-See Note 4
E	400Ω			AB-400	Bleeder

Note 1-Some models use 100KΩ in this application. IRC replacement BTS-100K.
Note 2-Not used in all models.
Note 3-On IRC replacement set slider 275Ω from one end.
Note 4-On IRC replacement set slider 1350Ω from one end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		LEWYT PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
34	10KΩ	3.3Ω	600Ω	.5Ω	W-351	A-3879	T22S47	A-2932	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			LEWYT PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-107		
35	PM	3.3Ω	W-350	Mod. P5-V	5A15	
	CONE DIA.	VC DIA.				
36	4-11/16"	3/4"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	LEWYT PART No.	MEISSNER PART No.	
37	Loop Ant.		1.3Ω	X364		
38	Osc. Coil	2.3Ω	5.8Ω	W356	14-1060	
39	Input IF	21.3Ω	21.3Ω		16-6668	
40	Output IF	22.3Ω	21.3Ω		16-6669	

BATTERIES

ITEM No.	VOLTAGE	LEWYT PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
41	9V "A"		#746			G3			2 Used in Series
42	90V "B"			#482			M30		2 Used in Series

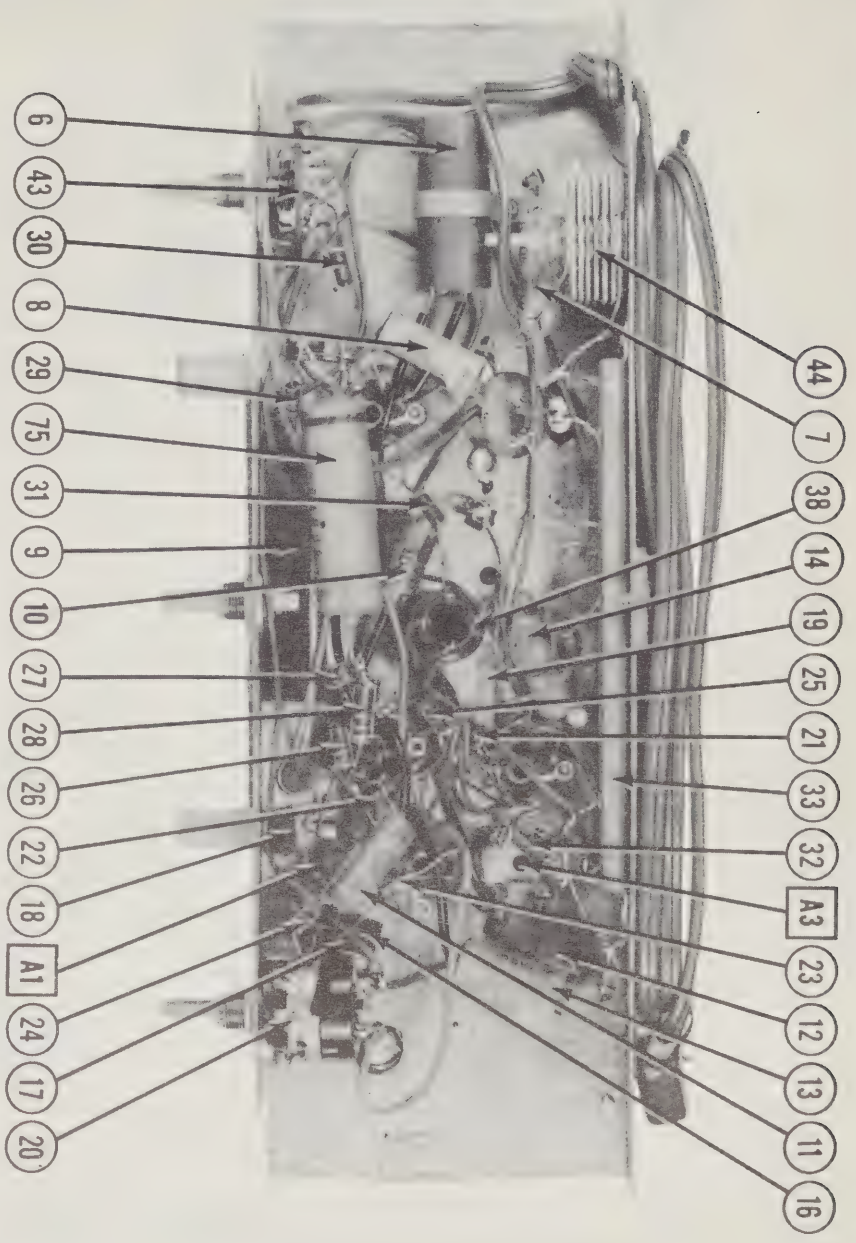
MISCELLANEOUS

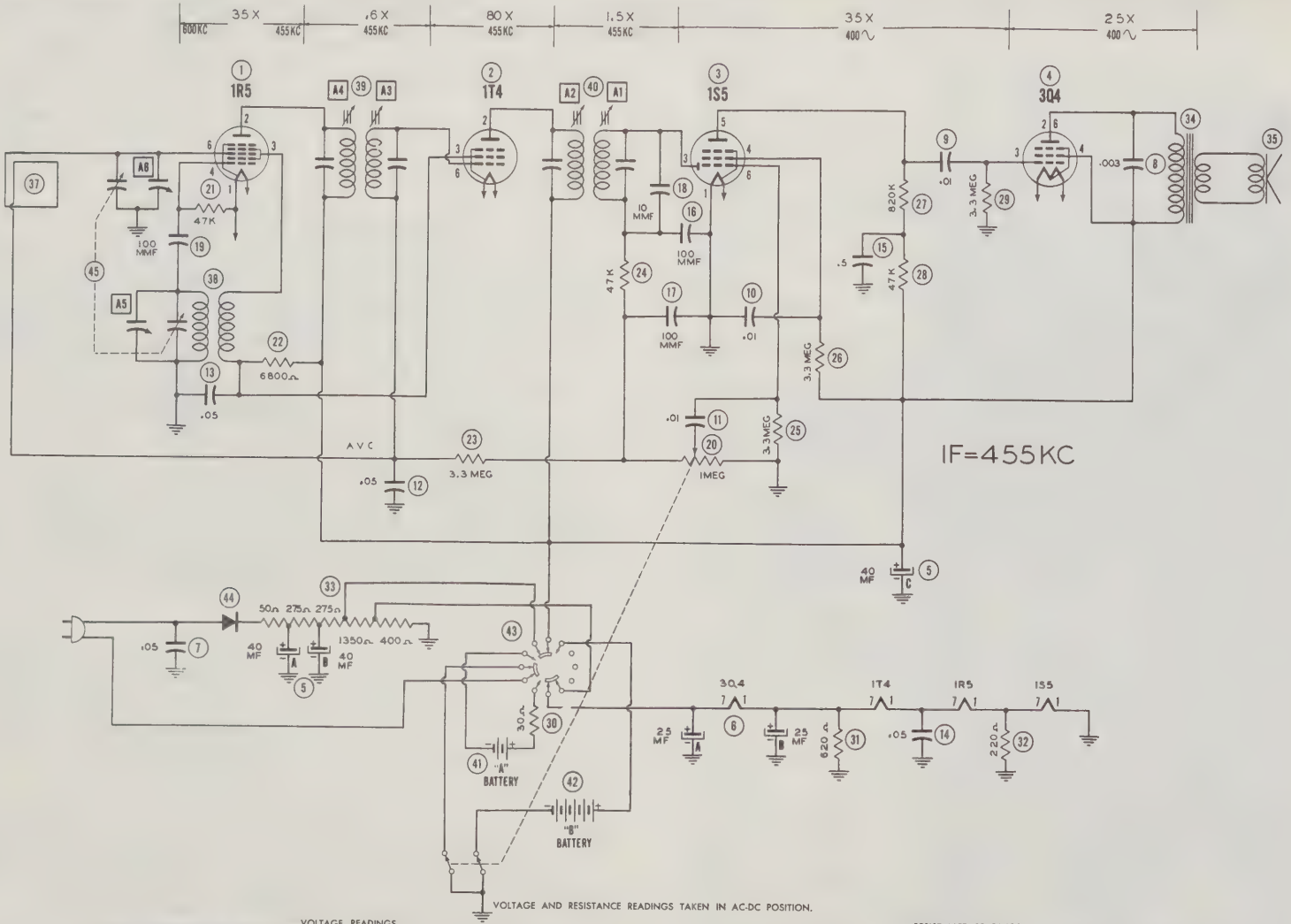
ITEM No.	PART NAME	LEWYT PART No.	NOTES
43	Switch		AC/DC Batt.
44	Rectifier		Selenium
45	2 Gang Var. Cap.	W23	(20-455MMF, 20-190MMF)

TUNING GANG FULLY CLOSED

DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.2VDC	85VDC	62VDC	-15VDC§	1.2VDC	0V.	2.4VDC
2	1T4	2.4VDC	85VDC	62VDC	85VDC	2.4VDC	0V.	3.5VDC
3	1S5	0V.	83VDC	0V.	15VDC	16VDC	0V.	1.2VDC
4	3Q4	3.5VDC	83VDC	0V.	85VDC	4.7VDC	83VDC	5.9VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	1.4KΩ	8.2KΩ	47KΩ	*	4.3 Meg.	*
2	1T4	*	1.4KΩ	8.2KΩ	1.4KΩ	*	4.3 Meg.	*
3	1S5	0Ω	1.4KΩ	1 Meg.	3.3 Meg.	87UKΩ	3.3 Meg.	*
4	3Q4	*	1.4KΩ	3.3 Meg.	1.4KΩ	*	1.4KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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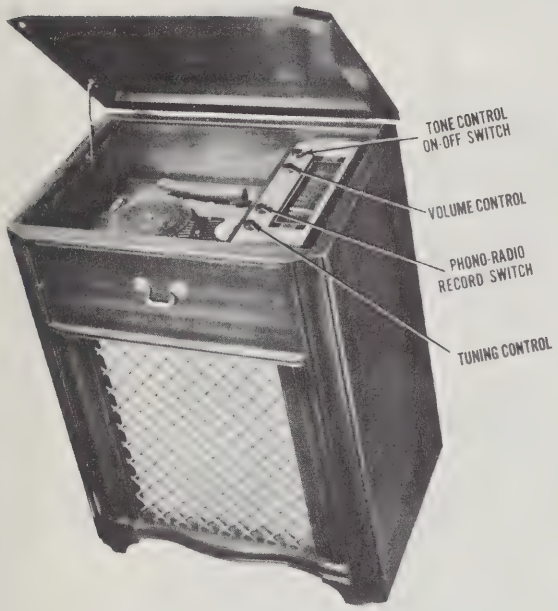
4812-16

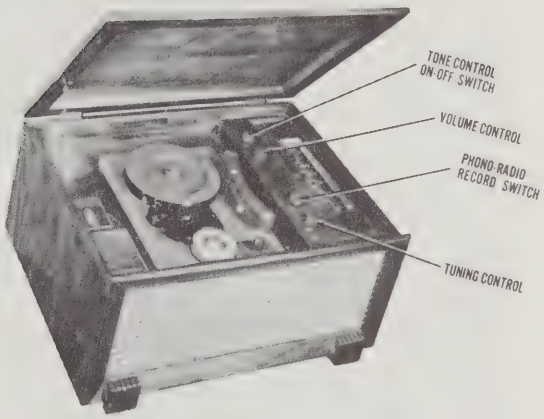
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

MAJESTIC MODELS 7YR753 (Ch. 7B09A-1), 7YR772 (Ch. 7B09A)

MAJESTIC MODELS 7YR753 (Ch. 7B09A-1), 7YR772 (Ch. 7B09A)





MAJESTIC MODELS 7YR753 (Ch. 7B09A-1), 7YR772 (Ch. 7B09A)

TRADE NAME	Majestic, Models 7YR753 (Ch. 7B09A-1), 7YR772 (Ch. 7B09A)
MANUFACTURER	Majestic Radio & Tele. Corp., Elgin, Ill.
TYPE SET	AC Operated Combination Phono-Superheterodyne Receiver with Wire Recorder
TUBES (SEVEN)	Types, 12SA7GT Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 12SJ7 Pre-Amp., 50B5 Bias Oscillator, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE--BROADCAST	540-1620KC RATING .45 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1500KC	1500KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAJESTIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Pre-Amp.	12SJ7	12SJ7	8N	
6	Bias Oscillator	50B5	50B5	7BZ	
7	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	MAJESTIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	150	19-25	AF88D	UP4215	DY-4020-150	EL-24	■ Filter
B	20	150						▲ "
9A	40	150	19-56	PRSA150/20-40	EDL4215	DSB-3x20-150*	TA-240	" - Red
B	20	150						" - Blue
10A	30	150	19-44	PRSA503010	EDL5315	DSB-5030-150	TA-530	Pre-Amp. Decoupling-Blue Filter - Red
B	50	150						
C	100	10			BRH121	M-100-12	UHC-112	Cathode Bypass-Or.
11	100	25	19-57	PRS25/100	BRH251	M-100-25	UHC-102	" "
12	.05	400	016-8	484-05	DT4S5	ST-4-05	TC-15	Line Filter-See Note
13	.2	200	5-51	484-.2	DT2P2	ST-2-2	TC-2	Bias Osc. Screen Bypass
14	.1	200	015-9	484-.1	DT2P1	ST-2-1	72P2	Line Isolation
15	.05	200	5-88	484-05	DT2S5	ST-4-05	TC-15	Phono Isolation
16	.006	200	5-90	484-006	DT6D6	ST-6-006	TC-26	Tone Compensation-See Note
17	.1	200	015-9	484-.1	DT2P1	ST-2-1	TC-1	Audio Coupling
18	.1	200	015-9	484-.1	DT2P1	ST-2-1	TC-1	Hum Balancing-See Note
19	.1	200	015-9	484-.1	DT2P1	ST-2-1	TC-1	Pre-Amp. Screen Bypass
20	.05	200	5-88	484-05	DT2S5	ST-4-05	TC-15	Audio Coupling
21	.05	200	5-88	484-05	DT2S5	ST-4-05	TC-15	Tone Compensation-See Note
22	.01	400	015-5	484-01	DT4S1	ST-4-01	TC-11	" "
23	.1	200	015-9	484-.1	DT2P1	ST-2-1	TC-1	Audio Coupling
24	.002	200	017-2	484-002	DT6D2	ST-6-002	TC-22	" "
25	.05	200	5-88	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
26	1500	500	021-24	1467-0015	1W5D15	MW.5-215	1FM-215	Osc. Grid Cap.
27	5600	500	021-56	1467-006	1D5D6	MW.5-26	1FM-26	Fixed Trimmer
28	1000	300	6-230	1468-001	1W5D1	MO.3-21	1FM-21	Tone Compensation
29	5000	300	6-259	1467-005	1D5D5	MW.5-25	1FM-25	" "
30	5000	300	6-259	1467-005	1D5D5	MW.5-25	1FM-25	Recording Indicator Coup.
31	220	500	020-53	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
32	56	500	6-174	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter
33	5000	300	6-259	1467-005	1D5D5	MW.5-25	1FM-25	RF Bypass-See Note
34	5000	300	6-259	1467-005	1D5D5	MW.5-25	1FM-25	Screen Bypass
35	5000	300	6-259	1467-005	1D5D5	MW.5-25	1FM-25	Output Plate Bypass

*-Parallel sections to obtain desired capacity.
Note-Not used in all models.

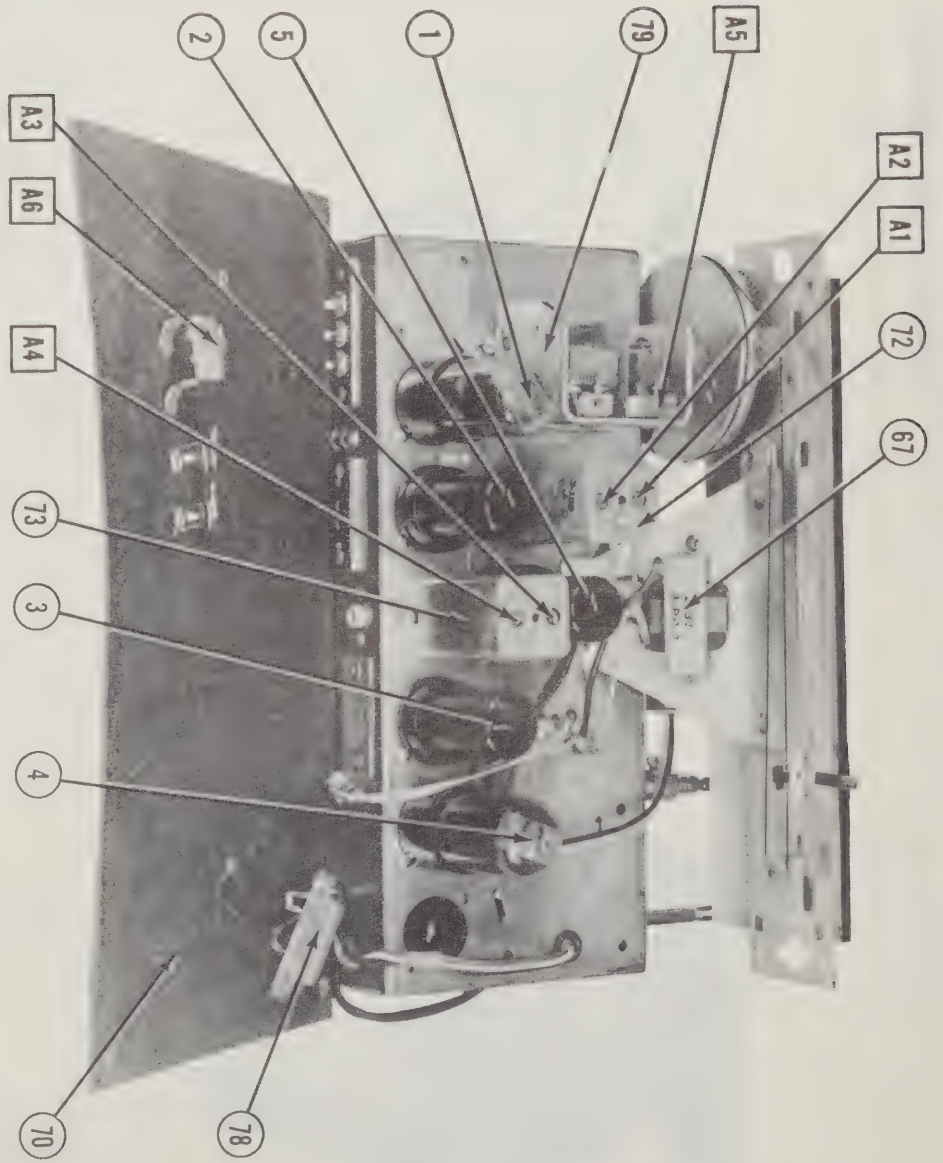
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	MAJESTIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
36A	2 Meg.	½	13-45	D13-139	AM-66-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 36A per instructions
37A	200KΩ	½	14-6	D13-130	AM-64-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 37A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	MAJESTIC PART No.	IRC PART No.	IDENTIFICATION CODES
38	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Osc. Grid
39	2200Ω	½	02-100	BTS-2200	Red-Red-Red Screen Dropping
40	3.3 Meg.	½	02-234	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
41	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Diode Filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAJESTIC PART No.	IRC PART No.	
42	4.7 Meg.	½	02-241	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
43	330KΩ	½	02-192	BTS-330K	Or.-Or.-Yl. AF Plate
44	470KΩ	½	02-199	BTS-470K	Yl.-Vi.-Yl. Output Grid
45	150Ω	1	03-52	BW-1-150	Br.-Grn.-Br. Output Cathode
46	1200Ω	1	03-90	BTA-1200	Br.-Red-Red Filter
47	10KΩ	½	02-127	BTS-10K	Br.-Blk.-Or. Tone Comp.-See Note 1
48	680KΩ	½	02-206	BTS-680K	Blue-Gray-Yl. Recording Ind. Net.
49	470KΩ	½	02-199	BTS-470K	Yl.-Vi.-Yl. Recording Ind. Net.
50	82KΩ	½	02-167	BTS-82K	Blue-Gray-Or. Tone Comp.
51	1 Meg.	½	02-313	BTS-1 Meg.	Br.-Blk.-Grn. Micrphone Shunt
52	220KΩ	½	02-185	BTS-220K	Red-Red-Yl. Phono Shunt
53	3Ω	1	9-336	BW-1-3	Or.-Blk.-Gold Voice Coil Shunt
54	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Tone Comp.
55	470KΩ	½	02-199	BTS-470K	Yl.-Vi.-Yl. Pre-Amp. Plate Load
56	2.2 Meg.	½	02-227	BTS-2.2 Meg.	Red-Red-Grn. Pre-Amp. Screen
57	3900Ω	½	02-111	BTS-3900	Or.-White-Red Pre-Amp. Cathode
58	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Pre-Amp. Decoupling
59	390Ω	2	9-343	BW-2-390	Or.-White-Br. Series Pilot Light
60	220KΩ	½	02-185	BTS-220K	Red-Red-Yl. Line Isolation
61	270Ω	½	02-62	BW-½-270	Red-Vi.-Br. Parasitic Supp.
62	22KΩ	½	02-143	BTS-22K	Red-Red-Or. Bias Osc. Grid
63	150Ω	1	03-52	BW-1-150	Br.-Grn.-Br. Filter
64	220Ω	2	04-59	BW-2-220	Red-Red-Br. "
65	22Ω	½		BW-½-22	Red-Red-Blk. Surge Limiter
66	370Ω	10	9-335	ABA-400	Line Dropping-See Note 2

Note 1-Not used in all models.
Note 2-Set slider on IRC replacement 30Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAJESTIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
67	4000Ω	2.8Ω	310Ω	2.5Ω	2-37	A-3856	T22846	A-2900	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MAJESTIC PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-117		
68A	PM	28Ω	22-50	Mod. P8-T	8A31	Used in Model 7YR772.
B	PM		22-52			Used in Model 7YR753.
	CONE DIA.	VC DIA.				
69	7-3/4"	1"				

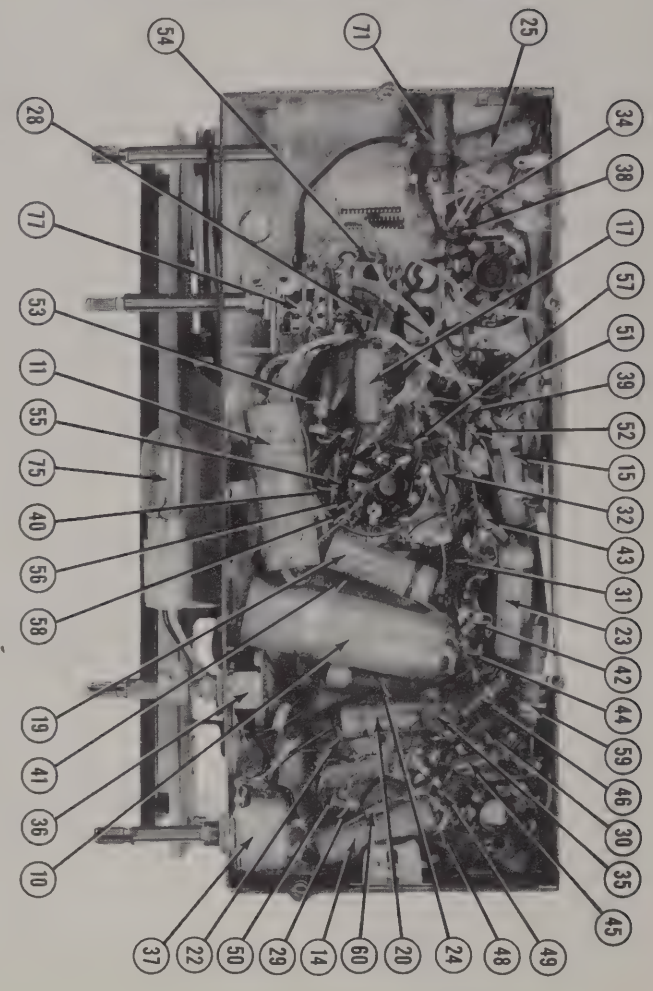
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MAJESTIC PART No.	MEISSNER PART No.	
70	Loop Ant.	.2Ω	1.7Ω	20-35		
71	Osc. Coil	1.2Ω	6Ω	S-1374	14-1060	
72	Input IF	21Ω	21Ω	3-159	16-6666	
73	Output IF	24Ω	23Ω	3-160	16-6667	
74	Bias Osc. Coil	.1Ω	6Ω	S-1572		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAJESTIC PART No.		
75	Bayonet	120					10 Watts

CHASSIS—BOTTOM VIEW



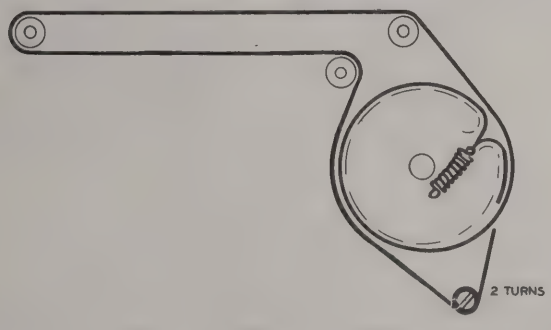
PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	MAJESTIC PART No.	ASTATIC PART No.	
76		L-71-A	L-71-A Original Part

MISCELLANEOUS

ITEM No.	PART NAME	MAJESTIC PART No.	NOTES
77	Switch	11-75	Radio-Phono-Record
78	Indicator	26-19	Neon
79	2 Gang Var. Cap	7-28	(21-455MMF, 28-192MMF)
A6	Trimmer	8-36	Ant. Adj.
	Dial Scale	117-66	Model 7YR753
	" "	117-85	Model 7YR772
	Dial Pointer	135-14	Model 7YR753
	" "	135-22	Model 7YR772

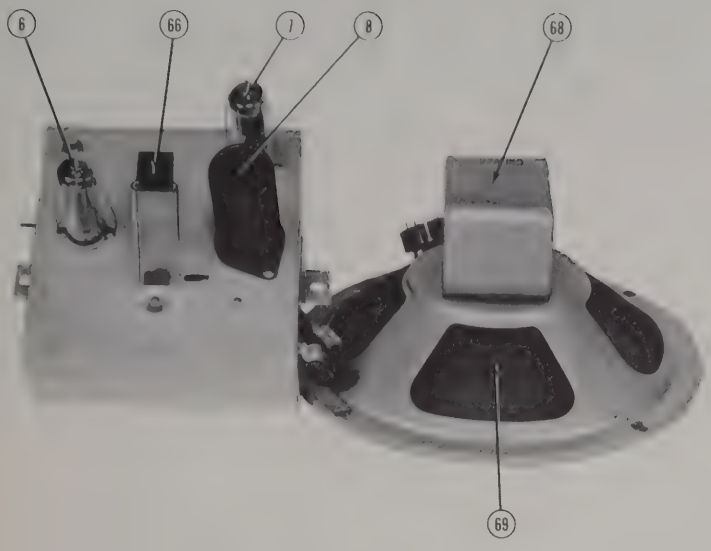


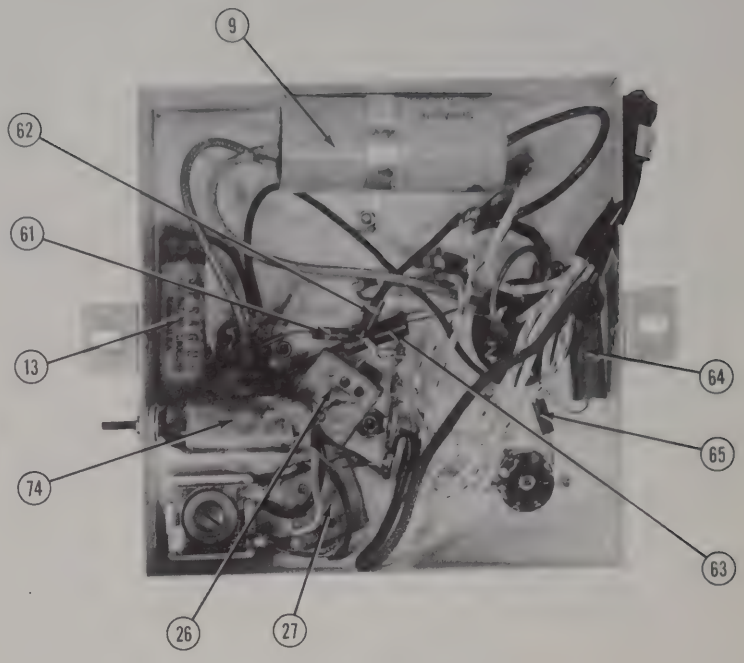
DIAL CORD DRIVE

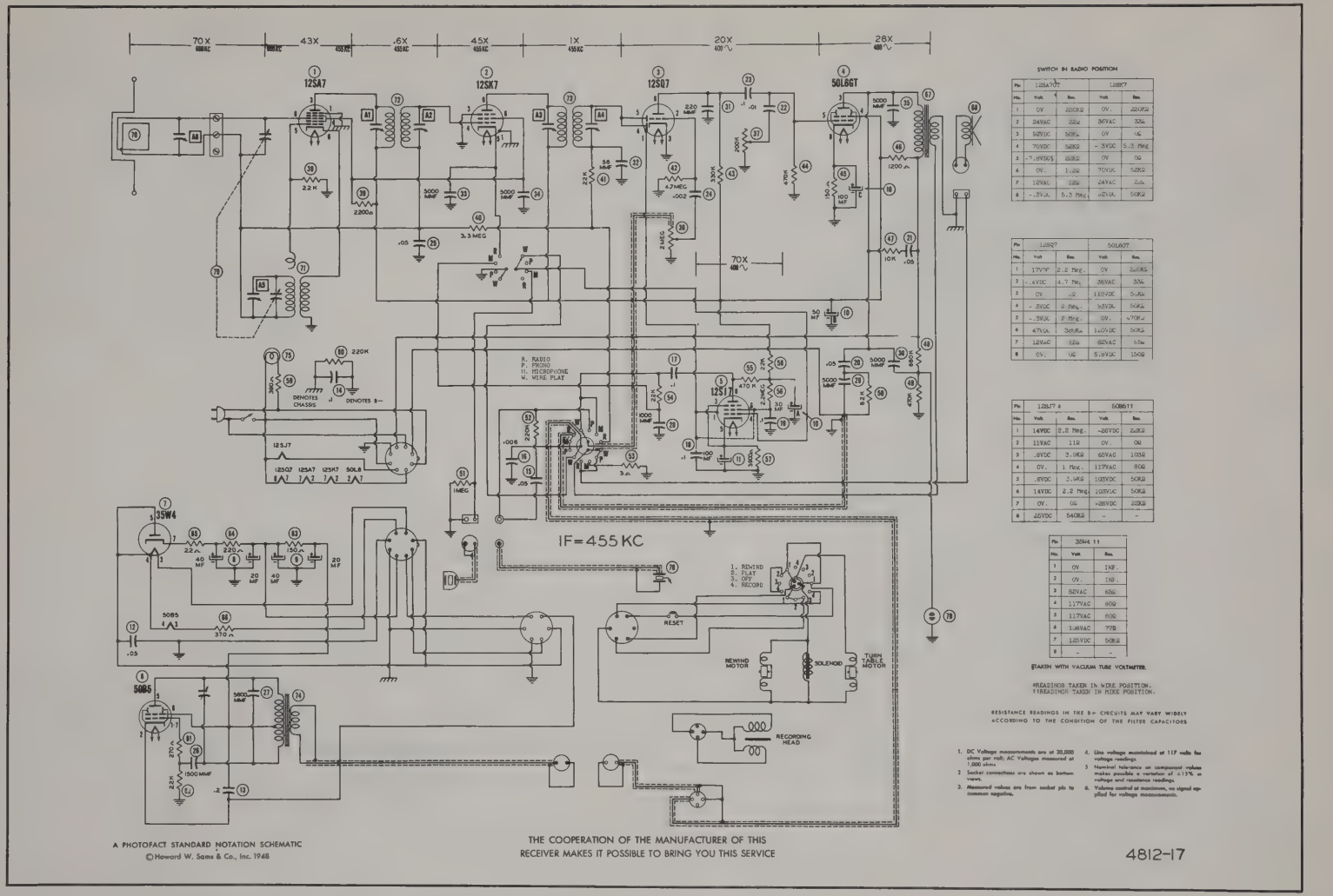
DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove ten Phillips head wood screws holding panel on rear of cabinet.
3. Remove power supply plug from tuning chassis.
4. Disconnect oscillator plug.
5. Disconnect wire recorder plug.
6. Remove phono-pickup plug from tuning chassis.
7. Remove microphone plug from tuning chassis.
8. Remove loop leads from terminal strip on tuning chassis.
9. Remove speaker plug from speaker.
10. Remove two Phillips head wood screws holding wire recorder oscillator chassis in cabinet. Remove oscillator chassis from cabinet.
11. Remove plug from recording head.
12. Remove two Phillips head screws holding neon record lamp in cabinet.
13. Remove two hex and two Phillips head screws holding tuning chassis in cabinet. Remove chassis from cabinet.
14. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.
15. Remove two Phillips head wood screws holding loop in cabinet.

DATE 7/48-4481-2-17 SCT #42-FOLDER #17







SWITCH IN RADIO POSITION

Pin No.	12SA7GT Volts	12SA7GT Res.	12SK7 Volts	12SK7 Res.
1	0V	220KΩ	0V.	220KΩ
2	24VAC	22Ω	86VAC	33Ω
3	96VDC	50KΩ	0V	0Ω
4	70VDC	52KΩ	-.3VDC	5.3 Meg
5	-7.6VDC	250Ω	0V	0Ω
6	0V.	1.2Ω	70VDC	52KΩ
7	12VAC	12Ω	24VAC	2Ω
8	-.3VDC	5.3 Meg	92VDC	50KΩ

Pin No.	12SR7 Volts	12SR7 Res.	50L6GT Volts	50L6GT Res.
1	17VAC	2.2 Meg.	0V	220KΩ
2	-.4VDC	4.7 Meg.	86VAC	33Ω
3	0V.	0Ω	110VDC	5.4KΩ
4	-.3VDC	2 Meg.	93VDC	50KΩ
5	-.3VDC	2 Meg.	0V.	470KΩ
6	47VAC	360Ω	110VDC	50KΩ
7	12VAC	12Ω	82VAC	0Ω
8	0V.	0Ω	5.8VDC	150Ω

Pin No.	12SJ7 Volts	12SJ7 Res.	50B5 Volts	50B5 Res.
1	14VDC	2.2 Meg.	-26VDC	2.2MΩ
2	11VAC	11Ω	0V.	0Ω
3	.6VDC	3.9KΩ	65VAC	100Ω
4	0V.	1 Meg.	117VAC	80Ω
5	.6VDC	3.4KΩ	103VDC	50KΩ
6	14VDC	2.2 Meg.	103VDC	50KΩ
7	0V.	0Ω	-26VDC	22KΩ
8	.65VDC	540Ω	-	-

Pin No.	35W4 Volts	35W4 Res.
1	0V	INF.
2	0V.	INF.
3	82VAC	65Ω
4	117VAC	80Ω
5	117VAC	80Ω
6	1.6VAC	7Ω
7	125VDC	50KΩ
8	-	-

†TAKEN WITH VACUUM TUBE VOLTMETER.

#READINGS TAKEN IN WIRE POSITION.
†READINGS TAKEN IN MIKE POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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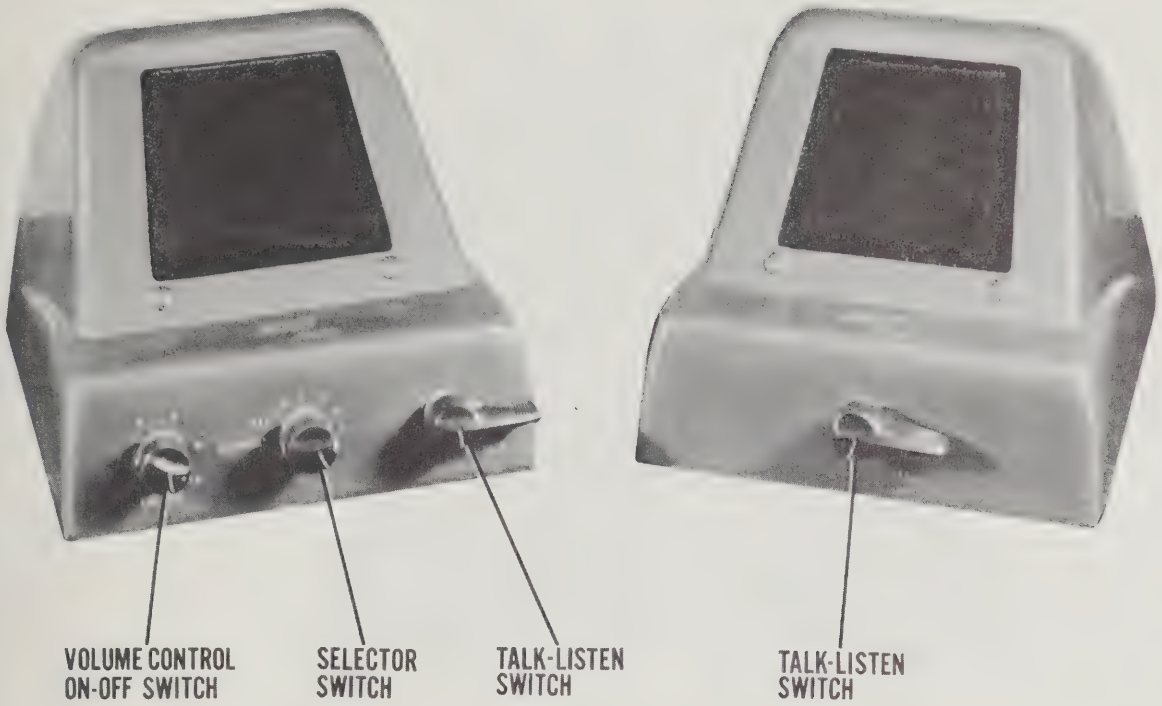
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

4812-17

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

MASCO MODELS JM-5 (Master Station), JR (Sub-Station)



TRADE NAME	Masco, Models JM-5 (Master Station), JR (Sub-Staion)
MANUFACTURER	Mark Simpson Mfg. Co, Inc., 32-28 49th St., Long Island City, N.Y.
TYPE SET	AC-DC Operated Inter-Communication System.
TUBES (THREE)	Types, 14F7 AF Amp., 50L6GT Power Output, 50Y6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC RATING .25 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14F7	12VAC	.6VDC	45VDC	0V.	0V.	55VDC	1VDC	0V.
2	50L6GT	0V.	60VAC	125VDC	120VDC	0V.	0V.	12VAC	8.2VDC
3	50Y6GT	0V.	111VAC	117VAC	140VDC	117VAC	132VDC	60VAC	140VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14F7	12Ω	2.2KΩ	240KΩ	810Ω	470KΩ	240KΩ	5KΩ	0Ω
2	50L6GT	INF.	60Ω	40KΩ	42KΩ	0Ω	0Ω	12Ω	150Ω
3	50Y6GT	INF.	110Ω	150Ω	40KΩ	150Ω	40KΩ	60Ω	40KΩ

VOLTAGE AND RESISTANCE READINGS TAKEN IN "ALL POSITION".

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of + 15% in voltage and resistance readings.
6 - Volume control at minimum, no signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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PARTS LIST AND DESCRIPTIONS

MASCO MODELS JM-5, JR

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MASCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	14F7	14F7	8AC	
2	Power Output	50L6GT	50L6GT	7AC	
3	Rectifier	50Y6GT	50Y6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4A	40	150		PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" -Red Tracer
5	8	450		PRS450/8	BR845	M-8-450	UT-8	"
6	8	450		PRS450/8	BR845	M-8-450	UT-8	"
7	10	50		PRS50-10	BR105	M-10-50	TA-510	Cathode Bypass
8	.005	600		684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
9	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Line Isolation
10	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Audio Coupling

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
11A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 11A per instructions
C	Switch			41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MASCO PART No.	IRC PART No.	IDENTIFICATION CODES
12	18Ω	½		BW-½-18	Br.-Gray-BLK. Input Shunt
13	2200Ω	½		BTS-2200	Red-Red-Red 1st AF Cathode
14	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
15	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
16	5000Ω	½		BTS-4700	Grn.-Blk.-Red 2nd AF Cathode
17	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Load
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Decoupling
19	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
20	2200Ω	½		BTS-2200	Red-Red-Red Filter
21	150	½		BW-½-150	Br.-Grn.-Br. Filter
22	40Ω	5		ABA-50	Line Dropping-See Note

Note-On IRC replacement set slider at 40Ω from one end.

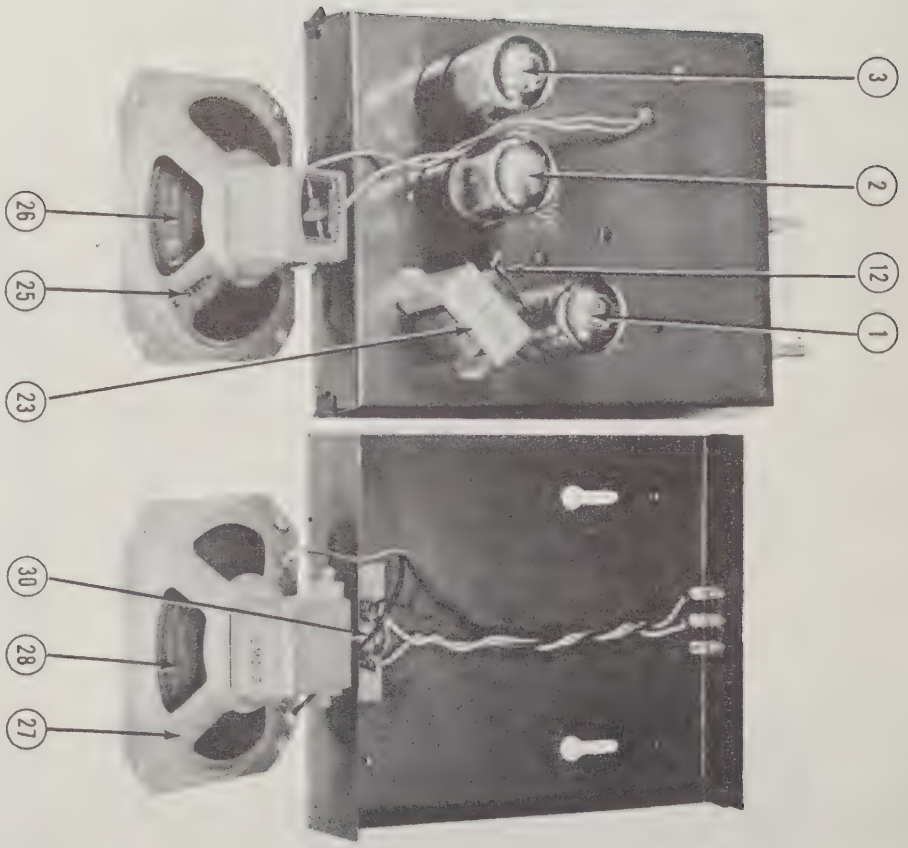
TRANSFORMER (INPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
23	12Ω	22KΩ	10.5Ω	815Ω	13IN2C		T-20A00#	A-2998*	*Connect in reverse using 7000Ω tap. #Drill one mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
24	1600Ω	12.0Ω	145Ω	1.2Ω	13-0-2C		T22S45#	A-2900	#Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: MASCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
25	FIELD PM	VC IMP. 12.0Ω	42M1-2	ST-113‡ Mod. P4-X		‡Replace output transformer to match 3.2Ω voice coil.
26	CONE DIA. 4"	VC DIA. 1/2"				
27	FIELD PM	VC IMP. 12.0Ω	42M1-2	ST-113‡ Mod. P4-X		
28	CONE DIA. 4"	VC DIA. 1/2"				

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
29	Switch		Talk-Listen(Master)
30	"		" " (Sub)
31	"		Selector

FOR NON-PRIVATE OPERATION

1. Determine the locations of the JM-5 master station and each JR remote-station.
2. From each JR remote-station run sufficient three-wire cable to allow proper connection of this cable to the JM-5 master station cable.
3. Connect cables from various JR remote-stations to JM-5 master-station cable according to connection chart.

C O N N E C T I O N C H A R T

	G	B	S
#1 JR	Grey	Black	Brown
#2 JR	Grey	Black	Red
#3 JR	Grey	Black	Yellow
#4 JR	Grey	Black	Green
#5 JR	Grey	Black	Blue

Colors refer to wires in JM-5 Master-station Cable.

OTE: Where it is impracticable for any JR remote-station to have its switch used, the installation of such a JR remote-station is virtually the same as any JR remote-station. Two-wire cable is used instead. The wire that normally is connected to the "B" terminal is omitted. The wire connected to the "S" terminal is also connected to the "B" terminal.

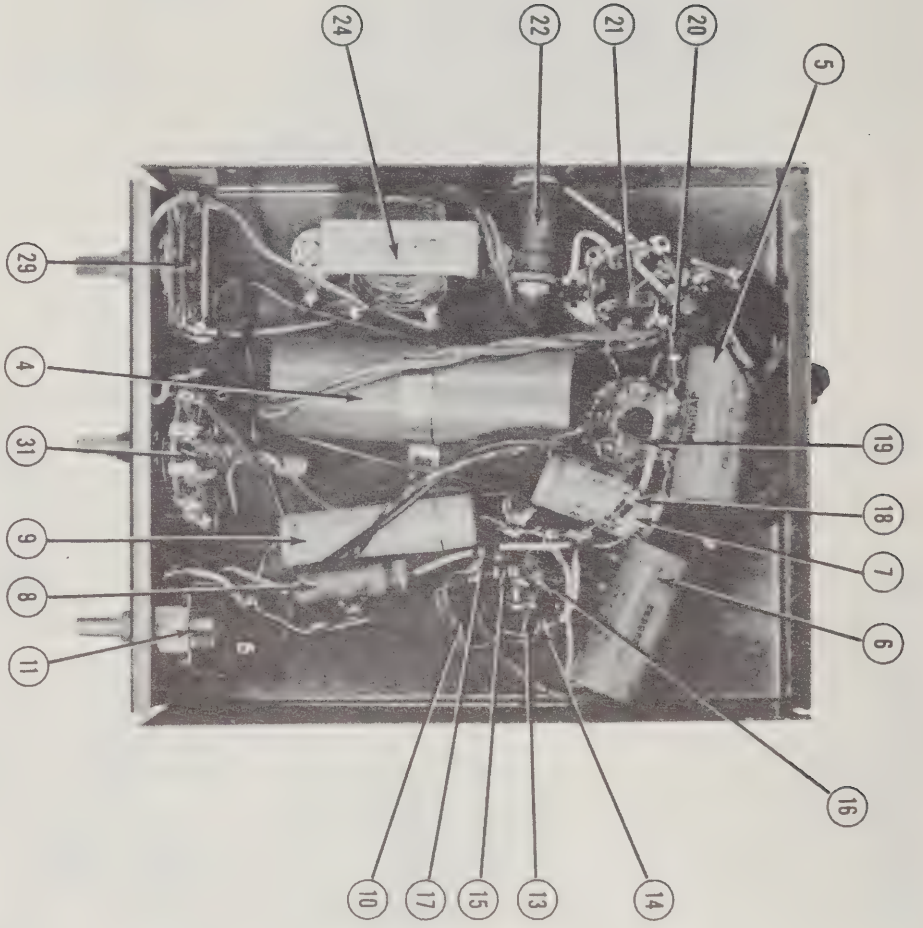
All stations may be wired using either method or any combination of the two methods.

FOR PRIVATE OPERATION (NON-EAVESDROPPING)

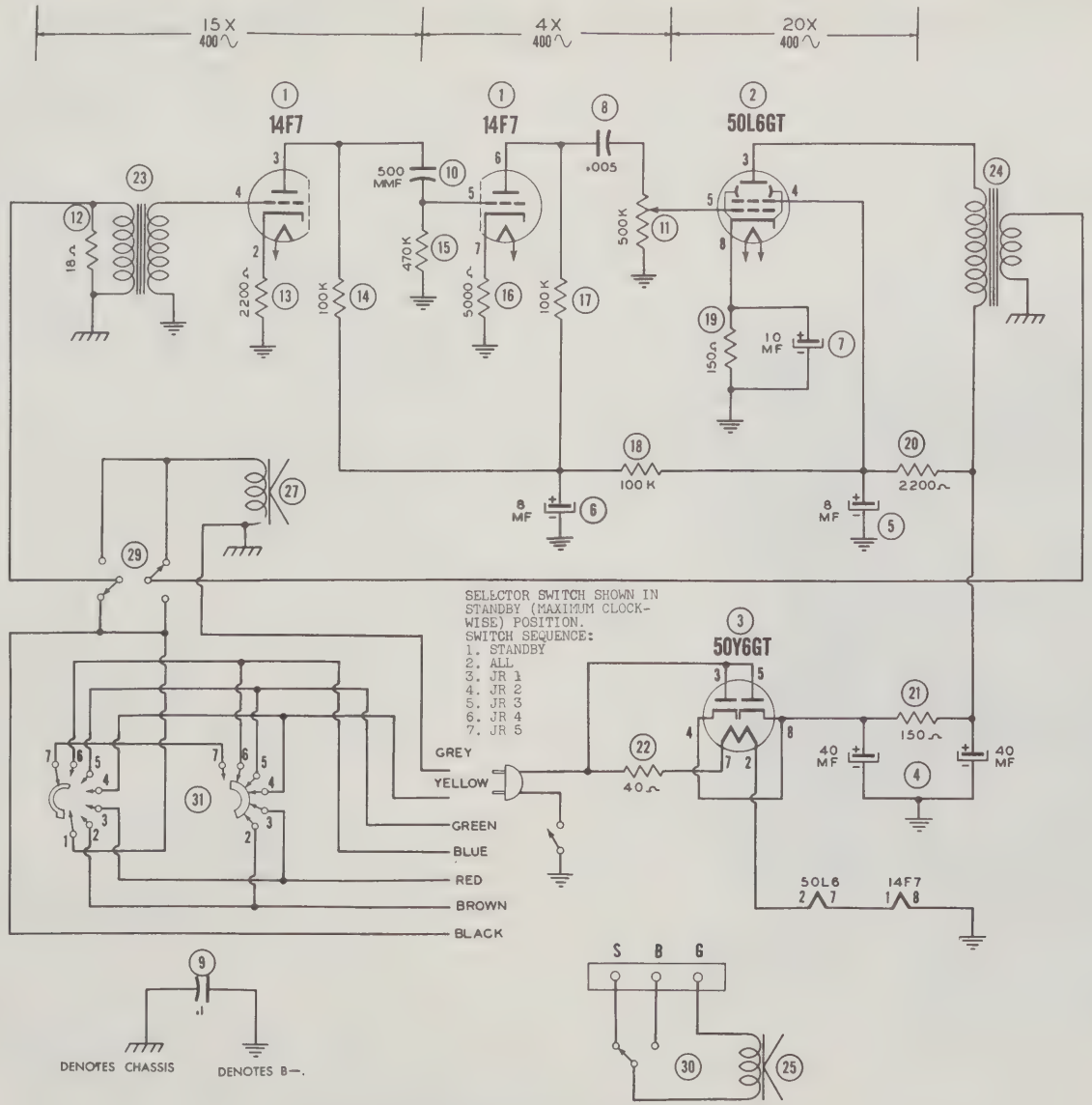
1. Follow steps 1 - 3 as outlined.
2. Remove JM-5 master station chassis from cabinet and then remove bottom plate.
3. Remove RED jumper wire from press-to-talk switch terminals.
4. Reassemble unit.
5. Finish installation as in Steps 4 & 5 previously outlined.

NOTE: When JM-5 master station is altered for private operation, all JR remote-stations must use their press-to-talk switches and hence require three-wire cable.

CHASSIS—BOTTOM VIEW



MASCO MODELS JM-5, JR



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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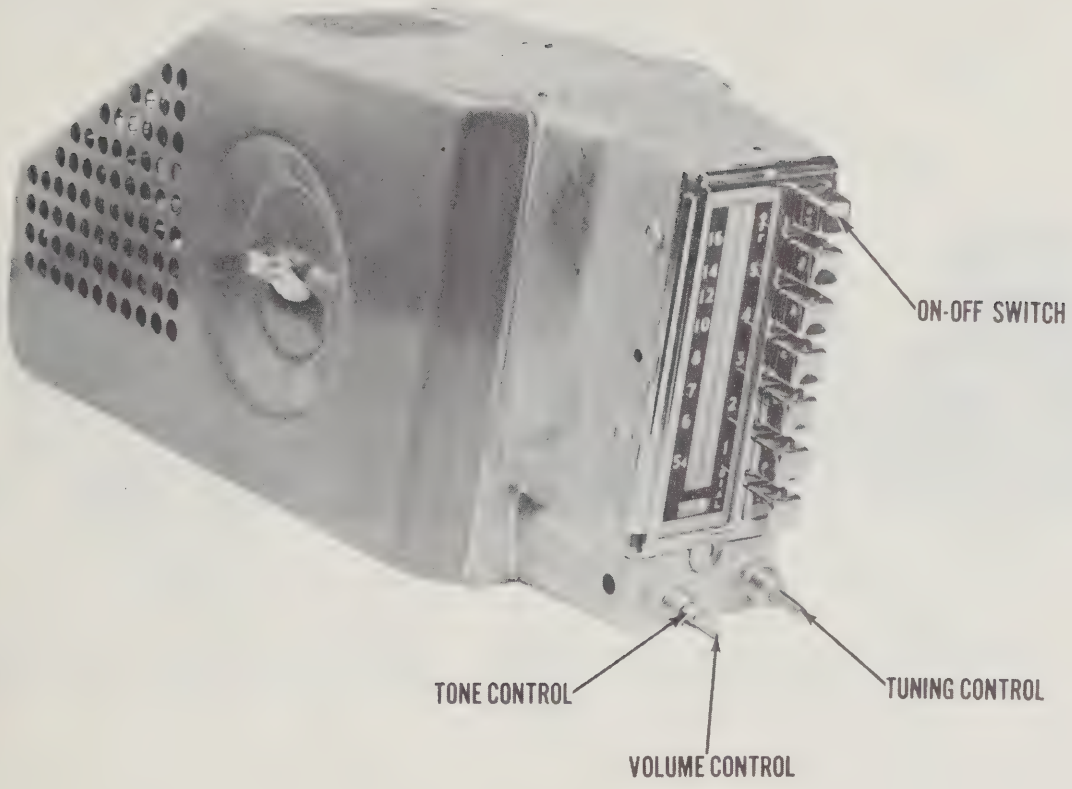

MOPAR MODEL 802 (REVISED)
(PHILCO C-4608)

MOPAR MODEL 802 (REVISED)
(PHILCO C-4608)

MOPAR MODEL 802 (REVISED)

TRADE NAME	Mopar, Model 802 (Revised) (Philco, C-4608)
SUPPLIER	Chrysler Corp., Detroit 31, Michigan
TYPE SET	Battery Operated Custom Built Automotive Superheterodyne Receiver
TUBES (EIGHT)	Types, 7A7 RF Amp., 7B8 Converter, 7A7 IF Amp., 7B6 Det.-AVC-AF, 7A4 Phase Inv., (2) 7C5 Power Output, 7Y4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 8 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning slugs completely out and set pointer to 1600KC.

For RF Alignment connect a 20MMFD capacitor in series with 30MMFD capacitor across output of signal generator with 20MMFD capacitor connected to high side. Connect antenna receptacle to junction of two capacitors. Connect low side of signal generator to chassis.

Tone control should be at "Voice" position, volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	20MMFD	High side to pin 6 (grid) of 7B8. Low side to chassis.	455KC	1600KC	Across voice coil.	A1, A2, A3, A4	Short Pin 4 of 7B8 to chassis. Adjust for maximum output.
2.	20MMFD	"	"	"	"	A5	Adjust for minimum output.
3.		See prealignment notes.	1400KC	Tune for maximum output.	"	A6	Remove short from Pin 4 of 7B8. Adjust for maximum output.
4.	20MMFD	"	600KC	"	"	A7	Rock tuning control and adjust for maximum output.
5.	20MMFD	"	550KC and 1460KC	Tune for maximum output.	"	A8	Set dial at 550KC. Tune sig. gen. to 1460KC and increase output. Adjust A8 for minimum output.
6.	20MMFD	"	1400KC	"	"	A6	Adjust for maximum output.
7.	20MMFD	"	600KC	580KC	"	A7	Rock tuning control and adjust for maximum output

When adjustments are completed, install receiver in car. With antenna extended, tune in weak station near 1400KC and adjust A6 for maximum volume.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOPAR-PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7B8	7B8	8X	
3	IF Amp.	7A7	7A7	8V	
4	Det.-AVC-AF	7B6	7B6	8W	
5	Phase Inv.	7A4	7A4	5AC	
6	Power Output	7C5	7C5	6AA	
7	" "	7C5	7C5	6AA	
8	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOPAR-PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	350	61-0150	AF444J4A	UP11145C	DY-402	EL-415	◓ Filter
B	10	350						■ "
C	5	300						▲ "
D	10	25						Cathode Bypass
10	.003	1500	61-0115	1684-003	MD16D3	STM-16-003	TR-23	Buffer
11	.5	100	61-0183	484-.5	DT2P5	SHH-1	TC-5	Hash Filter
12	.5	100	61-0183	484-.5	DT2P5	SHH-1	TC-5	" "
13	.0068	500	30-4650-91	684-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
14	.01	500	30-4650-41	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
15	.01	500	30-4650-41	684-01	DT6S1	ST-6-01	TC-11	" "
16	.0047	500	30-4650-39	684-005	DT6D5	ST-6-005	TC-25	" "
17	.01	500	30-4650-41	684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
18	.022	500	30-4650-26	684-02	DT6S2	ST-6-02	TC-12	Feedback
19	.0047	500	30-4650-39	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
20	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	" "
21	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	Tone Comp.
22	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	IF Cathode Bypass
23	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	Screen Bypass
24	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	Cathode Bypass
25	.047	500	30-4650-28	684-05	DT6S5	ST-6-05	TC-15	AVC Filter
26	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	Hash Filter-Cer.
27	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	" " "
28	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	" " "
29	100	500	30-1227-7	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
30	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	Feedback-Cer.
31	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.-Cer.
32	360	500	30-1220-13					Fixed Trimmer
33	55	300	61-0149					" " -Cer.
34	12	500	60-00125417					" "
35	220	300	30-1228-3	1468-00025	5W5T25	MO.5-325	1FM-325	Ant. Coupling-Cer.

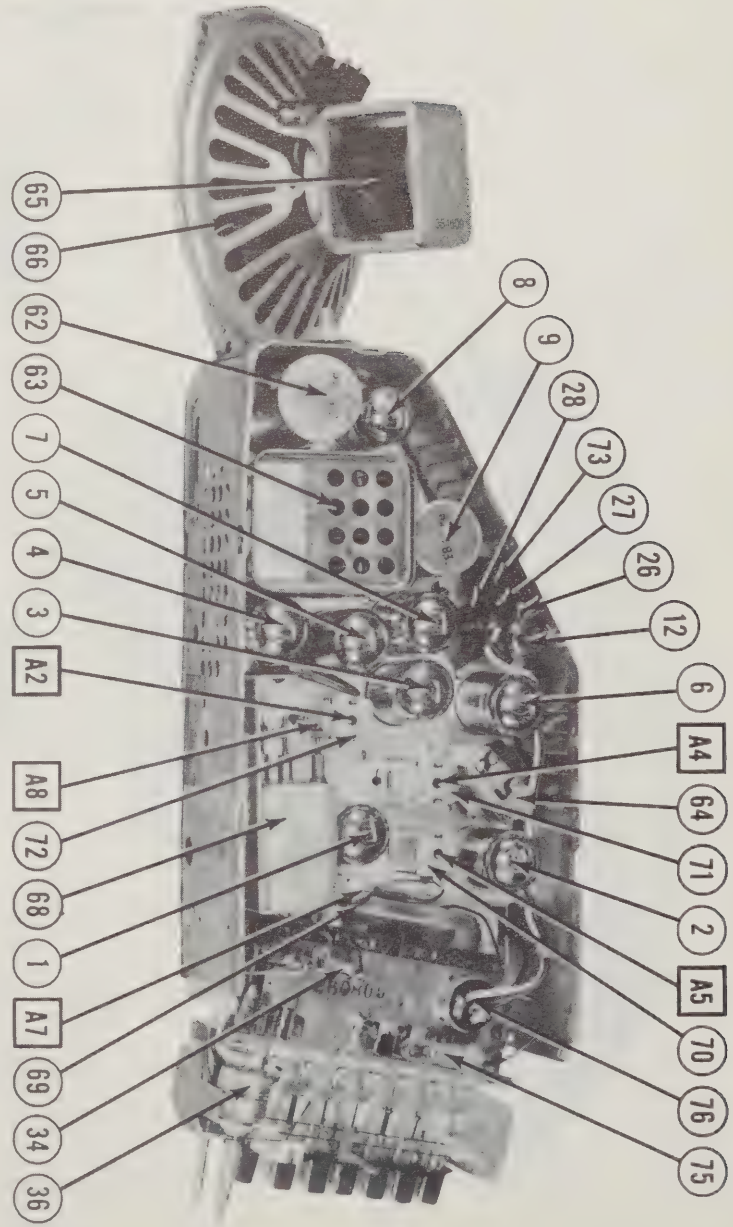
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOPAR. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
36A	350KΩ	½	67-0040			Volume Control } Dual Control
B	4 Meg.	½				Tone Control } Dual Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOPAR-PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
37	1 Meg.	½	66-5101540	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
38	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. RF Plate Load
39	220Ω	½	66-1228340	BW-½-220	Red-Red-Br. Cathode
40	100KΩ	½	66-4101540	BTS-100K	Br.-Blk.-Yl. Converter Grid
41	100KΩ	½	66-4101540	BTS-100K	Br.-Blk.-Yl. Osc. Converter
42	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Converter Screen Dropping
43	27KΩ	1	66-3273340	BTa-27K	Red-Vi.-Or. Screen Dropping
44	470Ω	½	66-1475340	BTa-47C	Yl.-Vi.-Br. IF Cathode-See Note
45	1 Meg.	½	66-5101540	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
46	220KΩ	½	66-4221540	BTS-220K	Red-Red-Yl. Tone Compensation
47	1 Meg.	½	66-5101540	BTS-1 Meg.	Br.-Blk.-Grn. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOPAR-PHILCO PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
48	47KΩ	½	66-4471540	BTS-4700	Yl.-Vi.-Red Tone Compensation
49	68KΩ	½	66-4681540	BTS-6800	Blue-Gray-Red " "
50	10 Meg.	½	66-6101540	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
51	220KΩ	½	66-4221540	BTS-220K	Red-Red-Yl. AF Plate Load
52	10 Meg.	½	66-6101540	BTS-10 Meg.	Br.-Blk.-Blue Phase Inv. Grid
53	220KΩ	½	66-4221540	BTS-220K	Red-Red-Yl. Phase Inv. Plate Load
54	220KΩ	½	66-4221540	BTS-220K	Red-Red-Yl. Phase Inv. Cathode
55	470KΩ	½	66-4471540	BTS-470K	Yl.-Vi.-Yl. Output Grid
56	470KΩ	½	66-4471540	BTS-470K	Yl.-Vi.-Yl. " "
57	330Ω	1	66-1334340	BW-1-330	Or.-Or.-Br. Output Cathode
58	2200Ω	½	66-2221540	BTS-2200	Red-Red-Red Feedback
59	1000Ω	1	66-2104340	BT-1-1000	Br.-Blk.-Red Filter
60	1000Ω	1	66-2104340	BT-1-1000	Br.-Blk.-Red "
61	100Ω	1	66-1104340	BT-1-100	Br.-Blk.-Br. Hash Suppressor
79	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Diode Filter

Note-Some models use 1000Ω in this application. IRC replacement BTS-1000.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA MOPAR-PHILCO PART No.	REPLACEMENT DATA RADIART PART No.	INSTALLATION NOTES
62	Interrupter	6.3 V DC	115 A.C.	83-0026	5326P	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MOPAR-PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
63	5.7V DC @ 1.9A	444V AC .085A DC			65-0347			

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA MOPAR-PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
64	10KΩ CT	3.7Ω	430Ω CT	.4Ω	32-8316	A-3856*	T22586*	A-2900*	*Drill one new mounting hole

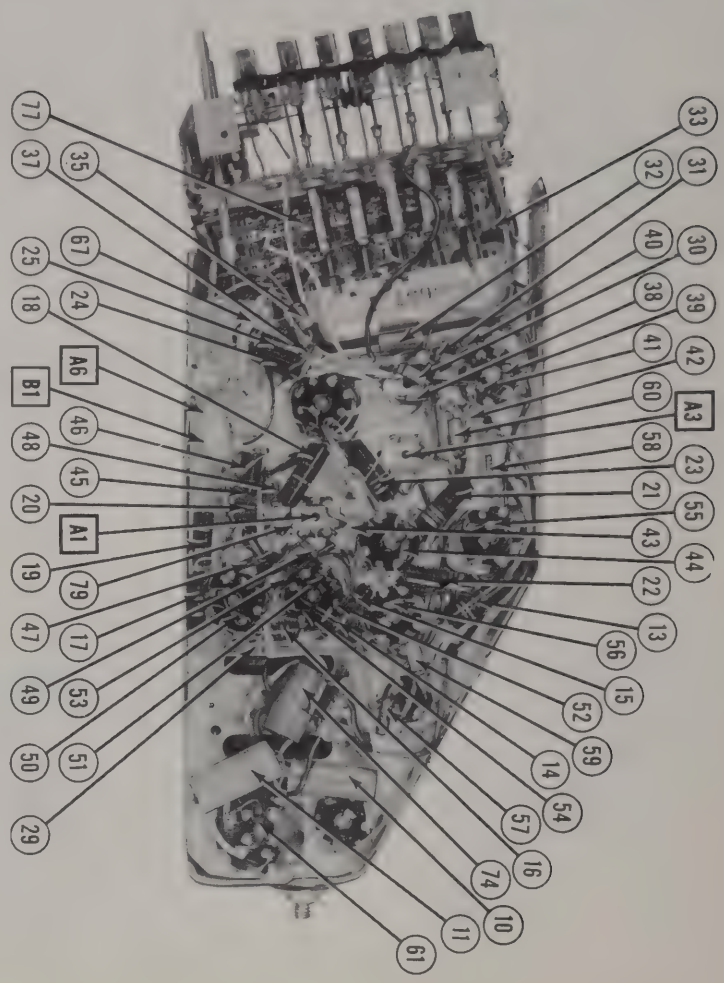
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA MOPAR-PHILCO PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
65	4.1Ω	3.7Ω	36-1609		7EV6	
	CONE DIA.	VC DIA.				
66	6-13/16"	7/8"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOPAR-PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.
67	Ant. Loading Coil		6.7Ω	65-0437	
68A	Ant.Coil		17Ω	77-0666-2	
B	Image Trap Coil		33Ω		
C	Osc. Coil		3.6Ω		
69	Osc. Shunt Coil	3.2Ω	5.8Ω	65-0440	
70A	RF Coil			32-4162	
B	IF wave Trap				
71	Input IF	12Ω	12Ω	32-4160	16-6668
72	Output IF	15Ω	15.5Ω	32-4161	16-6669
73	Hash Choke Coil		0Ω	32-1644	
74	Vib. Choke Coil		.1Ω	32-4170	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MOPAR-PHILCO PART No.		INSTALLATION NOTES
75	Bayonet	6-8	0.15	Brown	34-2068		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	MOPAR-PHILCO PART No.	NOTES
76	Switch	85-0127	On-Off
77	Pushbutton Assy.	77-0657-1	
78	Fuse	45-2559	14 Amp.
A6 B1	Trimmer Assy.	77-0788	Ant. Adj. " "
	Dial	27-5897	(Plymouth, Desoto, Chrysler)
	"	27-5898	(Dodge)

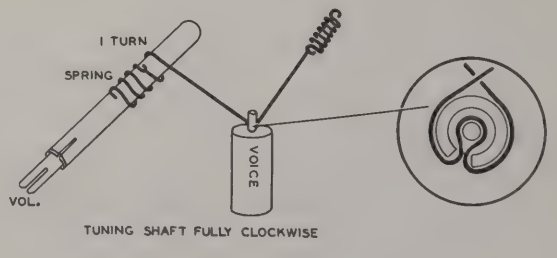
PUSHBUTTON ADJUSTMENTS

Range of buttons from top to bottom is; 850-1600KC, 750-1450KC, 710-1380KC, 625-1170KC, 535-1000KC.

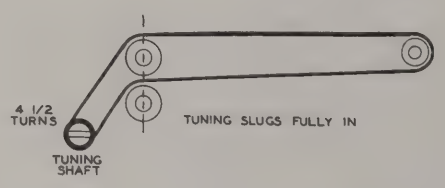
Make a list of stations desired to be set up, making sure that each station falls within the range of the button to be set up.

1. Turn set on and allow it to warm up for at least 20 minutes.
2. Remove pushbutton covers.
3. Depress dial button and manually tune in station desired to be set up with button #1.
4. Depress button #1 and tune in station with knurled end of button #1.
5. Check accuracy of setting by tuning the station manually, then depress button #1. If the setting is off retune with the knurled end of button #1.
6. To set up the remaining buttons follow the procedure outlined above.
7. After button #6 is set up, leave button depressed and adjust B1 for maximum volume.
8. Replace button covers.

Buttons may be set up outside of car but after installation they should all be given a final adjustment.



TUNING SHAFT FULLY CLOCKWISE



DIAL CORD DRIVE

VOLTAGE READINGS

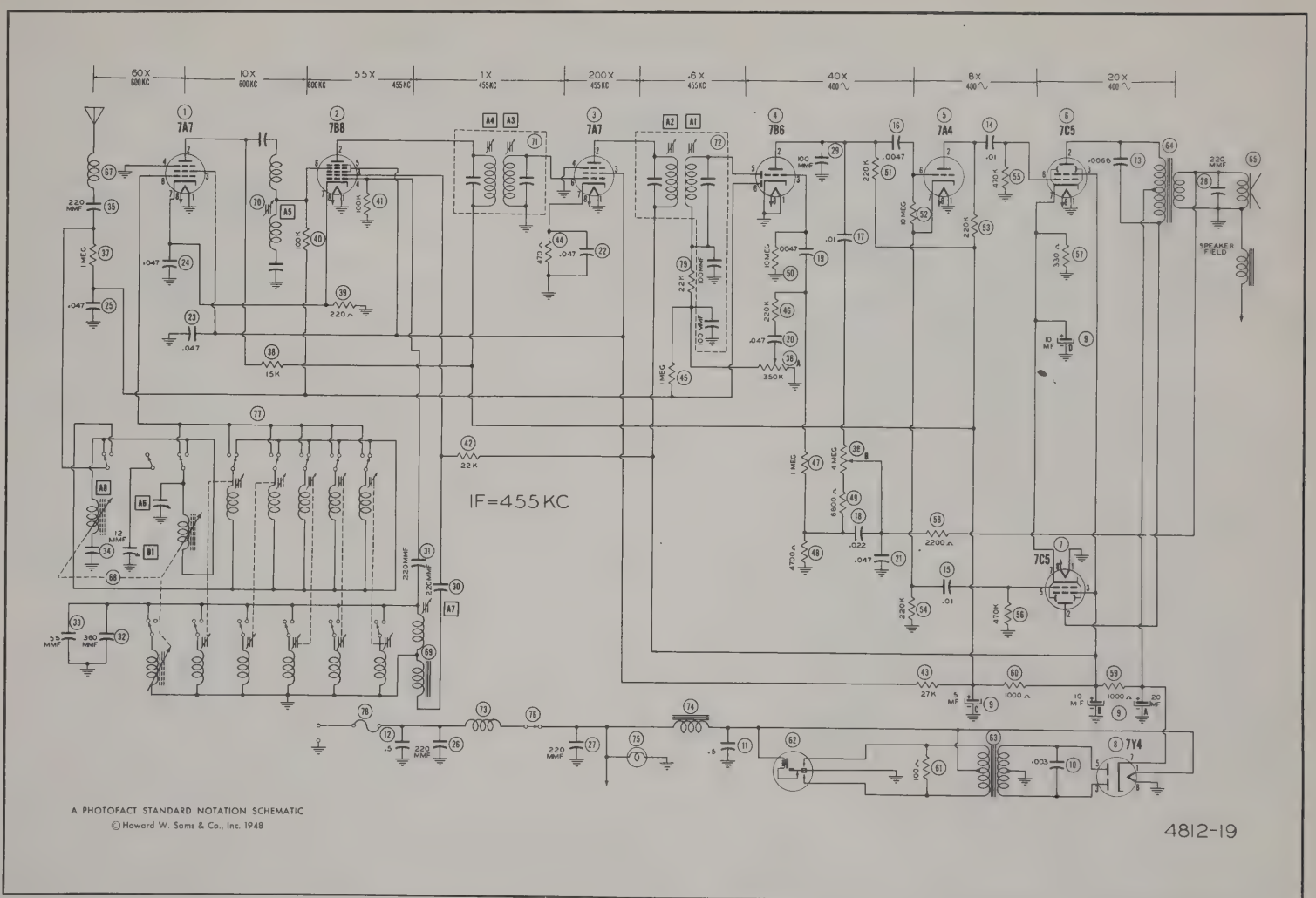
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0V.	115VDC	85VDC	0V.	0V.	-.1VDC	2.8VDC	6.2VDC
2	7B8	0V.	200VDC	140VDC	-4.9VDC	85VDC	-.1VDC	2.8VDC	6.2VDC
3	7A7	0V.	210VDC	85VDC	0V.	0V.	0V.	3VDC	6.2VDC
4	7B6	0V.	120VDC	-.5VDC	0V.	-.1VDC	-.2VDC	0V.	6.2VDC
5	7A4	0V.	120VDC	225VDC	0V.	120VDC	.2VDC	90VDC	6.2VDC
6	7C5	0V.	230VDC	215VDC	0V.	0V.	0V.	15VDC	6.2VDC
7	7C5	0V.	230VDC	215VDC	0V.	0V.	0V.	15VDC	6.2VDC
8	7Y4	6.2VDC	0V.	220VAC	0V.	0V.	220VAC	230VDC	0V.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0Ω	115KΩ	125KΩ	0Ω	0Ω	2.4 Meg.	220Ω	.2Ω
2	7B8	0Ω	100KΩ	120KΩ	150KΩ	120KΩ	1.5 Meg.	220Ω	.2Ω
3	7A7	0Ω	100KΩ	125KΩ	0Ω	0Ω	12Ω	470Ω	.2Ω
4	7B6	0Ω	320KΩ	10 Meg.	0Ω	1.4 Meg.	370KΩ	0Ω	.2Ω
5	7A4	0Ω	320KΩ	100KΩ	2KΩ	320KΩ	1½ Meg.	220KΩ	.2Ω
6	7C5	0Ω	100KΩ	100KΩ	0Ω	INF.	470KΩ	330Ω	.2Ω
7	7C5	0Ω	100KΩ	100KΩ	470KΩ	INF.	470KΩ	330Ω	.2Ω
8	7Y4	.2Ω	INF.	440Ω	INF.	INF.	410Ω	100KΩ	0Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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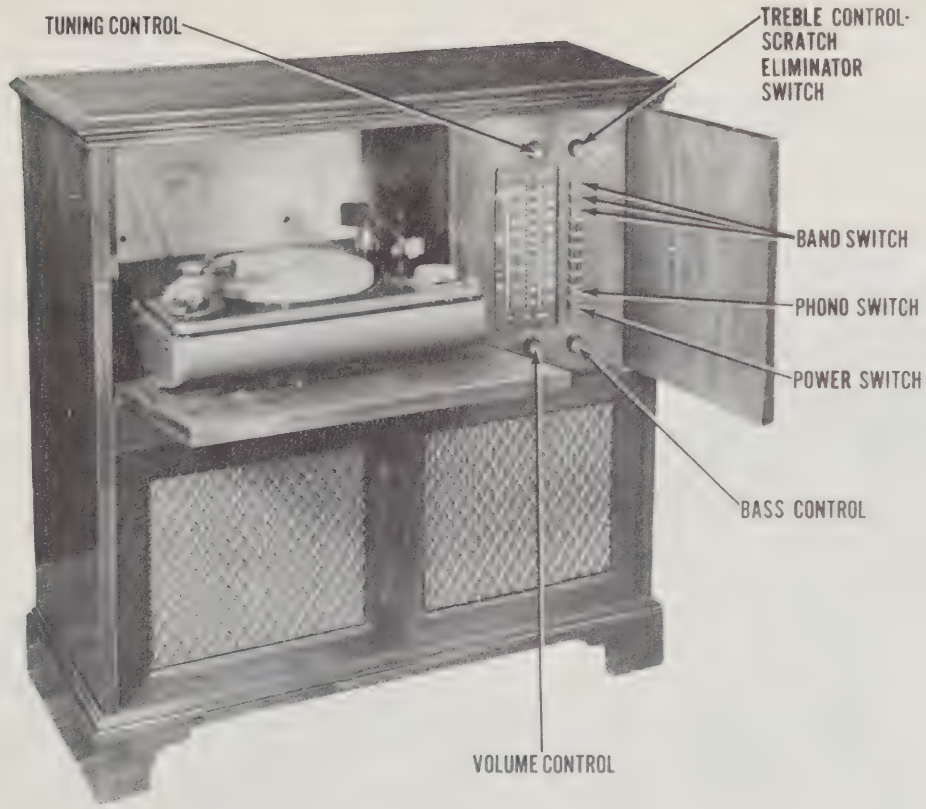
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.



PHILCO MODEL
48-1270

PHILCO MODEL
48-1270

PHILCO MODEL 48-1270

TRADE NAME	Philco, Model 48-1270
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio
TUBES (THIRTEEN)	Types, 7W7 FM RF Amp., 7F8 Converter, 7H7 1st IF Amp., 7B7 2nd IF Amp., 7H7 3rd IF Amp., FM1000 FM Det., 6SQ7GT Det.-AVC-AF, 7E7 Rectifier-Reactance, 7F7 AF Amp., 7AF7 Phono Amp.-Phase Inv., (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	1.04 Amp. @ 117 Volts AC

PUSHBUTTON ADJUSTMENTS

Range of buttons reading from left to right are 540-1000KC, 600-1200KC, 650-1300KC, 850-1500KC and 900-1600KC.

1. Make a list of stations desired to be set up ranging from low to high frequency stations, making certain that each station falls within range of its button.
2. Push in button next to off button and allow receiver to warm up for at least fifteen minutes.
3. Adjust B1 to tune in first station on list. Check for correct station by pushing in BC button and manually tuning in desired station.
4. Returning to original button adjust B2 for maximum volume.
5. Set up the remaining buttons by following the same procedure outlined above by adjusting B3, B5, B7 and B9 to tune in stations and B4, B6, B8 and B10 for maximum volume.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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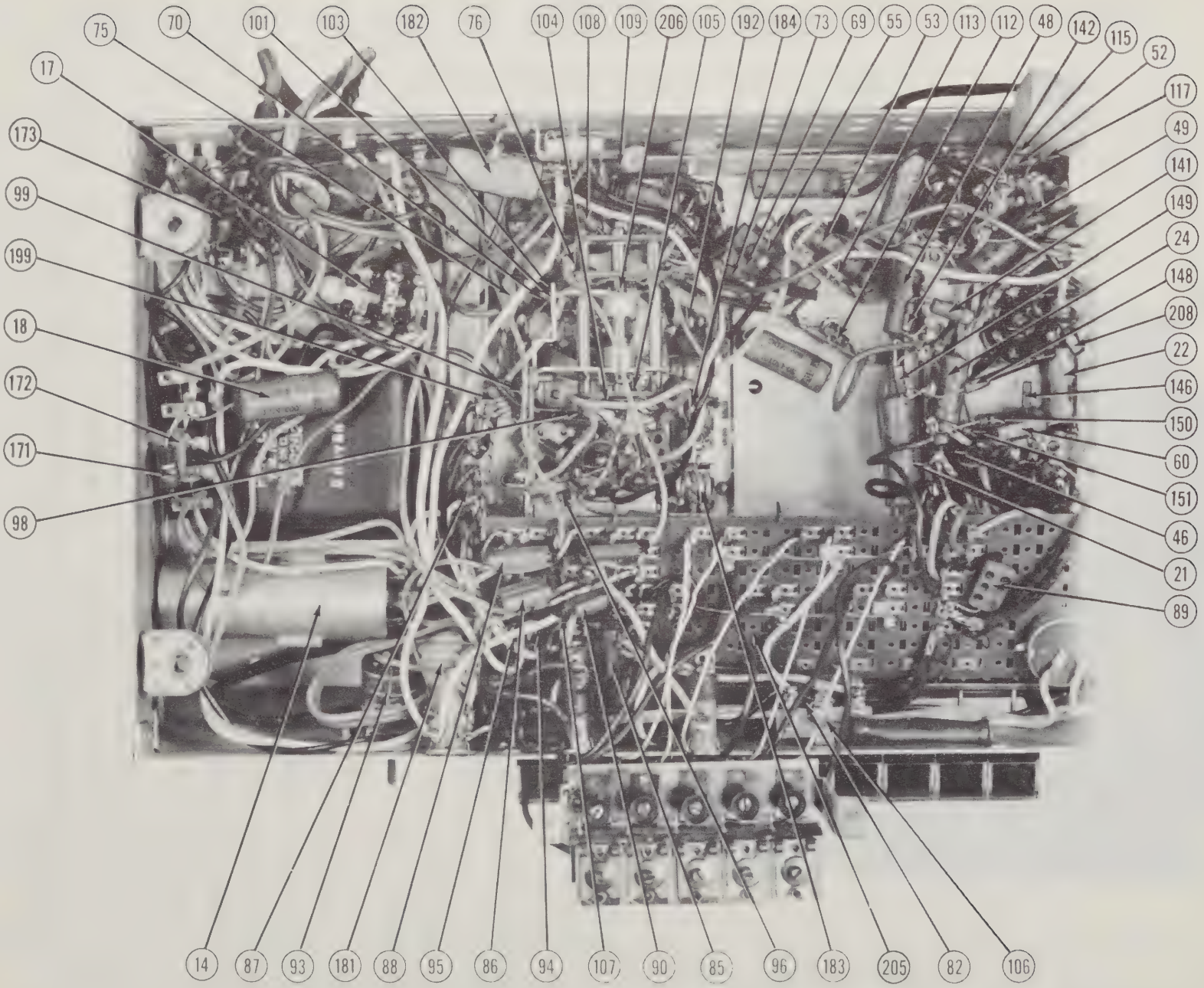
DATE 7/48-#4812-20 SET #42-FOLDER #20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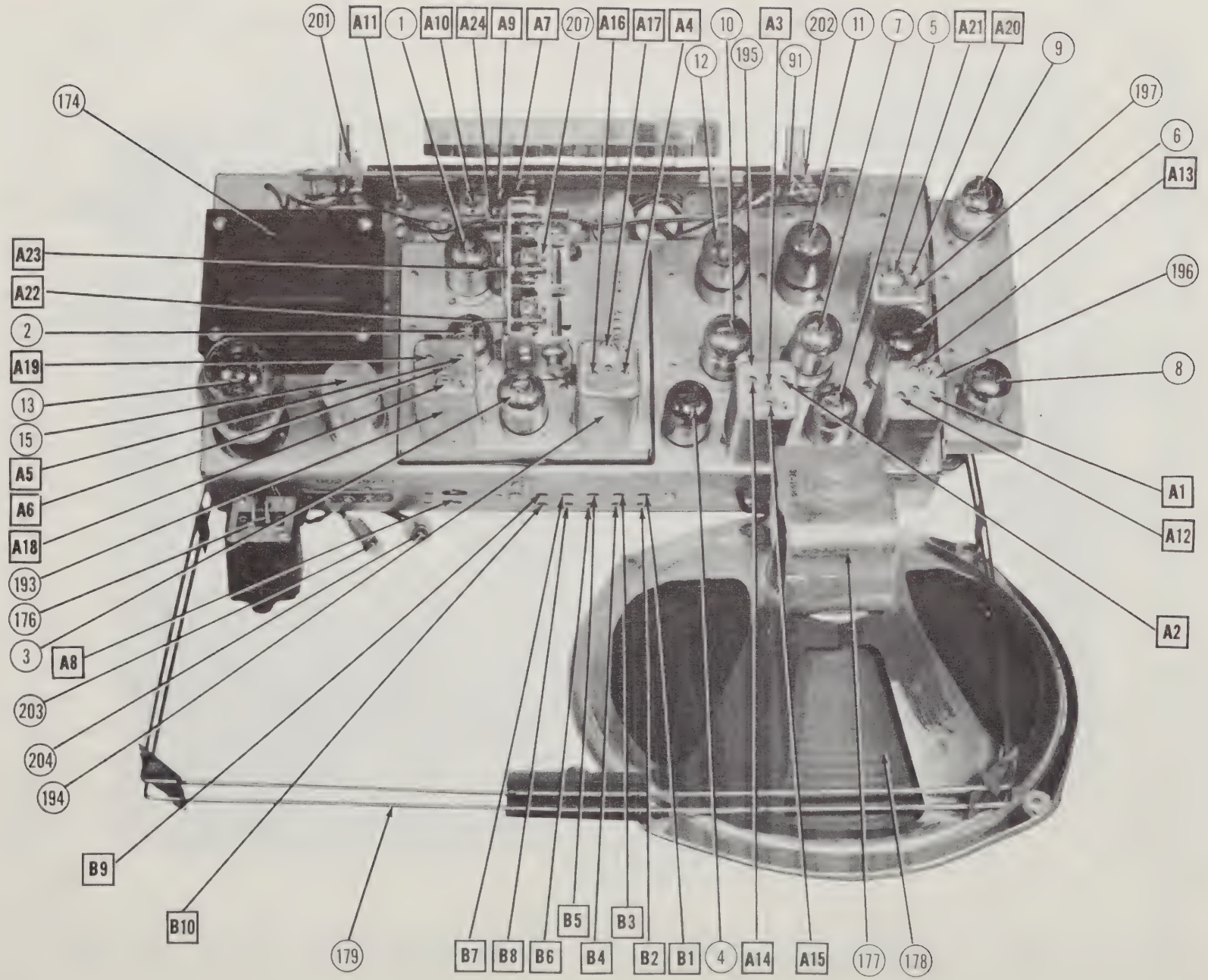
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	7W7	7W7	8BJ	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	7H7	7H7	8V	
4	2nd IF Amp.	7B7	7B7	8V	
5	3rd IF Amp.	7H7	7H7	8V	
6	FM Det.	FM1000	FM1000		
7	Det.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
8	Rect.-Reactance	7E7	7E7	8AE	
9	AF Amp.	7F7	7F7	8AC	
10	Phono Amp.-Phase Inv.	7AF7	7AF7	8AC	
11	Power Output	6V6GT	6V6GT	7AC	
12	" "	6V6GT	6V6GT	7AC	
13	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14	40	450	30-2568-5	AF8J	UP4045	DY-40-450	EL-4	Filter
15A	30	450	30-2570-1	AF444J	UP43145C	DY-3x20-450	EL-344	◓ "
B	15	450						■ "
C	10	450					UT-16	▲ "
16A	10	450	30-2552	AF44J	UP1145	DY-2x10-450	EL-210	■ Decoupling
B	10	450						▲ "
17A	.01		30-1226-1	464-01	DT6S1	MPH-6-01	TC-11	Line Filter
B	.01			484-01	DT6S1	MPH-6-01	TC-11	" "
18	.003	1000	61-0117	1084-003	MD16D3	STM-16-003	TC-23	RF Bypass Pwr. Supply
19	.5	400	61-0133	484-.5	DT4P5	SDH-4-5	TC-5	Bias Filter
20	.003	1000	66-2224340	1084-003	MD16D3	STM-16-003	TC-23	Output Plate Bypass
21	.1	400	66-4333340	484-.1	DT4P1	ST-4-1	TC-1	Decoupling
22	.02	400	33-5539-8	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
23	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	" "
24	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	" "
25	.001	600	45-3500-5	684-001	DT6D1	ST-6-001	TC-21	Tone Compensation
26	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Audio Coupling
27	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
28	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Bias Filter
29	.002	600	61-0062	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
30	.02	400	61-0062	484-02	DT4S2	ST-4-02	TC-12	Bias Filter
31	.03	400	45-3500-1	484-03	DT4S3	ST-6-03	TC-13	" "
32	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Diode Filter
33	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
34	.001	600	45-3500-5	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
35	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Tone Comp.
36	.02	400	33-5539-8	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
37	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	FM Det. Decoup.
38	.03	400	45-3500-1	484-03	DT4S3	ST-6-03	TC-13	Audio Coupling
39	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	FM Det. Screen Bypass.
40	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Filament Bypass
41	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Audio Coupling
42	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Plate Decoup.
43	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Screen Bypass
44	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	3rd IF Cathode Bypass
45	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
46	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Switch Bypass
47	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
48	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
49	.01	400	61-0120	684-01	DT6S1	ST-4-01	TC-11	2nd IF Plate Decoupling
50	.01	400	61-0120	684-01	DT6S1	ST-4-01	TC-11	2nd IF Screen Bypass
51	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Filament Bypass
52	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Cathode Bypass
53	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	AVC Filter

DATE 7/48-#4812-20 SET #42-FOLDER #20

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
54	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
55	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
56	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	Filament Bypass
57	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
58	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
59	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
60	150	500	60-10155407	1468-00015	5W5T15	MO.5-315	1FM-315	Audio Coupling
61	330	500	60-10335407	1468-00035	5W5T3	MO.5-33	1FM-335	" "
62	330	500	60-10335407	1468-00035	5W5T3	MO.5-33	1FM-335	Phase Shift Cap.
63	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	Tone Compensation
64	1500	300	60-20155404	1467-001	1W5D15	MW.5-215	1FM-215	RF Bypass
65	33	500	60-10205307	1468-000025	5W5Q3	MO.5-43	MS-43	Osc. Grid Cap.
66	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
67	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
68	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling
69	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	1st IF Screen Bypass
70	750	500	60-10755301	1468-00075	1W5T7	MW.5-37	1FM-37	Osc. Coupling
71	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
72	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Feedback
73	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	RF Bypass
74	510	500	60-10515307	1468-0005	5W5T5	MO.5-35	1FM-35	" "
75	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	" "
76	510	500	60-10515307	1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback
77	47	500	60-00515307	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling
78	510	500	60-10515307	1468-0005	5W5T5	MO.5-35	1FM-35	FM Amp. Decoup.
79	510	500	60-10515307	1468-0005	5W5T5	MO.5-35	1FM-35	FM Amp. Screen Bypass
80	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	Filament Bypass
81	10	500	60-00105407	1468-00001	5W5Q1	MO.5-41	1FM-41	RF Coupling
82	285	500	30-1224-14					Osc. Feedback-Cer.
83	485	500	30-1224-15					" " "
84	300	500	60-1035307	1468-0003	5W5T3	MO.5-33	MS-33	Fixed Padder
85	255	500	30-1220-24					" "
86	10	500	60-00105407	1468-00001	5W5Q1	MO.5-43	MS-41	Neutralizing Cap.
87	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	RF Bypass
88	220	500	60-10205307	1468-00025	5W5T25	MO.5-325	1FM-325	" "
89	22	500	60-00205307	1468-000025	5W5Q2	MO.5-42	MS-42	" "
90	22	500	60-00205307	1468-000025	5W5Q2	MO.5-42	MS-42	RF Coupling
209	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Filament Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
91A	2 Meg.	½	33-5535-5	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 91A per instructions
92	1 Meg.		33-5539-7			Bass Control
93	500KΩ	½	33-5539-8			Treble Control and scratch elim. switch.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
94	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Bleeder
95	100Ω	½	66-1103340		Br.-Blk.-Br. Parasitic Suppressor
96	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
97	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. RF Screen Dropping
98	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. RF Plate Load
99	3300Ω	½	66-3333340	BTS-3300	Or.-Or.-Red RF Decoupling
100	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Grid

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		• REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
101	25KΩ	½	66-3253340	BTS-22K	Red-Red-Or. Oscillator Plate Load
102	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Plate Load
103	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Converter Cathode
104	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Converter Grid
105	10Ω	½	66-0103340		Br.-Blk.-Blk. Parasitic Suppressor
106	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Oscillator Cathode
107	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Converter Grid
108	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Converter Plate Decoupling
109	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. 1st IF Grid
110	180Ω	½	66-1183340		Br.-Gray-Br. 1st IF Cathode
111	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 1st IF Screen Dropping
112	3300Ω	½	66-2333340	BTS-3300	Or.-Or.-Red 1st IF Plate Decoupling
113	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
114	180Ω	½	66-1183340		Br.-Gray-Br. 2nd IF Cathode
115	1500Ω	½	66-2153340	BTS-1500	Br.-Grn.-Red 2nd IF Cathode
116	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd IF Screen Dropping
117	3300Ω	½	66-2333340	BTS-3300	Or.-Or.-Red 2nd IF Plate Decoupling
118	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. AVC Network
119	100Ω	½	66-1103340		Br.-Blk.-Br. Inverse Feedback
120	180Ω	½	66-1183340		Br.-Gray-Br. 3rd IF Cathode
121	82KΩ	½	66-3823340	BTS-82K	Gray-Red-Or. 3rd IF Screen Dropping
122	3300Ω	½	66-2333340	BTS-3300	Or.-Or.-Red 3rd IF Plate Decoupling
123	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
124	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
125	270KΩ	½	66-4273340	BTS-270K	Red-Vi.-Yl. Diode Load
126	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Compensation
127	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. FM Detector Screen Dropping
128	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Locked Osc. Grid
129	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. FM Detector Plate Decoupling
130	27Ω	½	66-0273340		Red-Vi.-Blk. Parasitic Suppressor
131	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Compensation
132	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. FM Detector Decoupling
133	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. 1st AF Grid
134	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue Bias Network
135	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. " "
136	4.7Ω	½	66-9473340	BW-½-4.7	Yl.-Vi.-Gold Feedback
137	68Ω	½	66-0683340	BW-½-68	Blue-Gray-Blk. "
138	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Tone Compensation
139	220KΩ	½	66-4273340	BTS-220K	Red-Red-Yl. 1st AF Plate Load
140	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Phase Inverter Grid
141	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Phase Inverter Cathode
142	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Phase Inverter Cathode
143	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. Phase Inverter Plate Load
144	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
145	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
146	6800Ω	½	66-2683340	BTS-6800	Blue-Gray-Red Phono Amp. Cathode
147	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Phono Amp. Grid
148	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Phono Amp. Plate Load
149	470KΩ	½	66-4483340	BTS-470K	Yl.-Vi.-Yl. Phono Amp. Plate Decoupling
150	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Audio Voltage Divider
151	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. " " "
152	680KΩ	½	66-4683340	BTS-680K	Blue-Gray-Yl. Tone Compensation
153	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. 1st Supp. Amp. Grid
154	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red 1st Supp. Amp. Cathode
155	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. 1st Supp. Amp. Plate Load
156	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd Supp. Amp. Plate Load
157	560KΩ	½	66-4563340	BTS-560K	Grn.-Blue-Yl. 2nd Supp. Amp. Grid
158	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Bias Network
159	560KΩ	½	66-4563340	BTS-560K	Grn.-Blue-Yl. " "
160	1.5 Meg.	½	66-5153340	BTS-1.5 Meg.	Br.-Grn.-Grn. " "
161	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
162	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. " "
163	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
164	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
165	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Reactance Tube Grid
166	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Bleeder
167	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Reactance Tube Screen Dropping
168	18KΩ	½	66-3183340	BTS-18K	Br.-Gray-Or. Reactance Tube Plate Load
169	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Bias Network
170	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
171	15KΩ	1	66-3154340	BTA-15K	Br.-Grn.-Or. Filter
172	15KΩ	1	66-3154340	BTA-15K	Br.-Grn.-Or. "
173	10Ω	1	66-0104340	BW-1-10	Br.-Blk.-Blk. Series Pilot Light
208	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Tone Comp.

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
184	FM RF Coil		0Ω	32-3992		
185	BC Osc. "		3.5Ω	32-4019-4	14-1060	
186	PB " "		1.8Ω	32-4059		
187	" " "		1.8Ω	32-4059		
188	" " "		2.8Ω	32-4059-1		
189	" " "		2.8Ω	32-4059-1		
190	" " "		2.8Ω	32-4059-1		
191	SW " "		0Ω	32-3996		
192	FM " "		0Ω	32-3994		
193A	AM 1st IF	1.2Ω	20Ω	32-4020-1		
B	FM 2nd IF	1Ω	1.2Ω			
194A	AM 2nd IF		7Ω†	32-4001		†Includes both sec.
B	FM 2nd IF	1.2Ω				
195A	AM 3rd IF	10Ω‡	14Ω†	32-4002		‡Includes both pri.
B	FM " "					
196A	AM 4th IF	6Ω‡	9Ω	32-4003-2		
B	FM 4th IF		.3Ω			
197	FM Det.Tran.	1Ω	.5Ω	32-4004		
198	RF Choke		.1Ω	32-4111		
199	" "		0Ω	32-4089		
200	Cathode Chk.		8Ω	32-4007-1		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
201 thru 204	Bayonet	7.5	0.2	White	34-2040		Type 51

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
205	Switch	42-1777	PB Assembly
206	"	76-2211	AM-FM
207	Tuning Gang	31-2694	AM (18-520MMF, 18-520MMF)
A7, A9, A10	Trimmer Strip	31-6477	SW Osc. Adj. / BC Osc. Adj. / BC Ant. Adj.
A8	Trimmer	31-6473-2	SW Ant. Adj.
A11	Padder	31-6473-3	BC Osc. Adj.
A22			FM Osc. Adj.
A23	Trimmer Strip	31-2694	FM RF Adj.
A24			FM Ant. Adj.
	Trimmer Strip	31-6479	B2,B4,B6,B8,B10
	Dial Pointer	56-3179	
	Dial Scale	76-2226-4	(M) Includes Backplate Assby.
	Dial Scale	76-2226-5	(L & W) Includes Backplate Assby.
	Knob "	54-4227-1	(L) Control
	"	54-4227	(M & W)

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
174	117V AC @ 1.04A	700V CT .128A DC	5.2V AC @ 3.0A	6.8V AC @ 3.6A SEC.4 6.8V CT @ .3A				

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
175	8200Ω CT	3.6Ω	580Ω CT	.5Ω	32-8274	A-3824	T22S56	A-2936*	*Drill one new mounting hole.

TRANSFORMER (MATCHING)

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO	DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI. to SEC.	PRI.	SEC.					
176	1 to 70	.3Ω	570Ω	32-8256				

SPEAKER

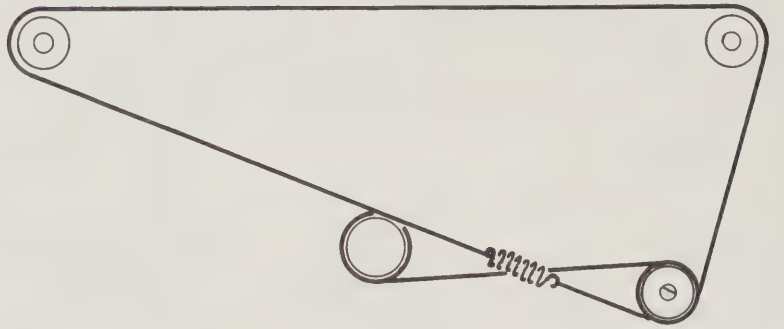
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD RES.	VC IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
177	460Ω	3.6Ω	36-1606			
	CONE DIA.	VC DIA.				
178	11-3/8"	1"	NOT READILY REPLACEABLE-USE COMPLETE SPEAKER UNIT.			

R F COILS

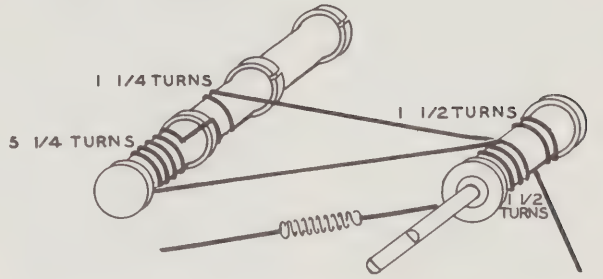
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.
179	Loop Ant.		0Ω	76-2262	
180	FM Dipole			76-2381-2	
181	BC Ant.Coil		1.5Ω	32-4049-1	
182	SW " "		0Ω	32-4050-2	
183	FM " "		0Ω	32-3993	

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove loop antenna leads from terminal strip on chassis.
3. Remove FM antenna plug from chassis.
4. Remove phono-motor plug from chassis.
5. Disconnect phono-pickup plug.
6. Remove speaker plug from speaker.
7. Remove cabinet light from front of cabinet.
8. Remove phono-compartment light from bracket.
9. Remove four hex head bolts holding chassis mounting board in cabinet. Remove chassis and mounting board from cabinet.
10. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



TUNING GANG FULLY CLOSED



DIAL CORD DRIVE

DATE 7/48-#4812-20

SET #42-FOLDER #20

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer 3 5/16" from left edge of dial backplate.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
When complete alignment must be made AM alignment must be done first. If FM alignment is not necessary then AM only may be done.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to front stator of tuning cap. Low side to chassis.	455KC	BC	Tuning cap fully open.	From terminal 3 of ant. terminal strip to chassis.	A1, A2, A3, A4 A5, A6	Adjust for maximum output in order given once only. Do not repeat.
2.		Loop	15MC	SW	9 11/16" from left edge of dial backplate.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for max. output. Tune signal gen. to 15.9MC. If image is not heard tune signal gen. to 15MC and loosen trimmer until next peak it obtained. Adjust for maximum output and recheck for image.
3.		"	"	"	Tune for max. output.	"	A8	Rock tuning cap. and adjust for maximum output.
4.		"	1700KC	BC	10" from left edge of dial backplate.	"	A9	Adjust for maximum output.
5.		"	1500KC	"	Tune for max. output.	"	A10	Adjust for maximum output.
6.		"	580KC	"	"	"	A11	Rock tuning cap. and adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made making Step 4 last adjustment.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

Load network consists of 4700Ω resistor in series with .1MFD cap. In Step 7 it will be necessary to force a piece of wire or solder down between ceramic form of A13 and edge of trimmer plate. Then attach the load to this wire and chassis.
In Steps 17 & 20 use a tuning wand to adjust FM Coils. If output increases when brass end of wand is inserted in coil expand coil slightly. If output increases unon insertion of powdered iron and compress coil slightly. Coil is properly adjusted when upon insertion of either end of wand causes a decrease in output.
In Step 19 of output meter alignment and Step 16 of scope alignment connect a dipole to Pins 1 & 2 of FM Ant. Socket. Connect a dipole to output of signal generator and space the two dipoles several feet apart. Each dipole may consist of two 30 inch lengths of wire.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	.1MFD	High side to switch tap of FM RF Coil (184). Low side to chassis.	9.1MC (modulated)	FM	Tuning cap. fully closed.	From terminal 3 of ant. terminal strip to chassis.	A12	Ground Pin 2 of FM1000 Tube to Chassis. Connect load network (See pre-alignment notes). From high side of secondary of FM 4th trans. (196B) to chassis. Adjust for maximum output.
8.	.1MFD	"	"	"	"	"	A13	Connect network from Pin 2 (Plate) 7H7 3rd IF Tube (5) to chassis. Adjust A13 for maximum output.
9.	.1MFD	"	"	"	"	"	A14	Connect network from Pin 6 (grid) 7H7 3rd IF Tube (5) to chassis. Adjust A14 for max. output.
10.	.1MFD	"	"	"	"	"	A15	Connect network from Pin 2 (plate 7B7 2nd IF Tube (4) to chassis. Adjust A15 for max. output.
11.	.1MFD	"	"	"	"	"	A16	Connect network from Pin 6 (grid) 7B7 2nd IF Tube (4) to chassis. Adjust A16 for max. output.
12.	.1MFD	"	"	"	"	"	A17	Connect network from Pin 2 (plate) 7H7 1st IF Tube (3) to chassis. Adjust A17 for max. output.
13.	.1MFD	"	"	"	"	"	A18, A19	Leave network as in last step, adjust A18, A19 for max. output. Remove short from Pin 2 of FM 1000 Tube, remove leading netw.
14.	.1MFD	High side to Pin 6 (grid) 7H7 1st IF Tube (3). Low side to chassis.	9.1MC (unmodulated)	"	"	"	A20	Connect jumper from Pin 4 (plate) FM1000 Tube to junction of resistor 129 and capacitors 38 & 64. Adjust A20 for zero beat.
15.	.1MFD	"	"	"	"	"	A21	Remove jumper from previous step and adjust A21 for zero beat.
16.	.1MFD	High side to Pin 2 (Tap on 183) of FM aerial socket. Low side to chassis.	105MC (modulated)	"	8 13/16" from left end of dial backplate.	"	A22	Connect short from Pin 2 of FM1000 tube to chassis. Adjust A22 for maximum output.
17	.1MFD	"	88MC	"	3 5/8" from left edge of dial backplate.	"	FM Osc. Coil (192)	Adjust per pre-alignment notes. Repeat steps 16 & 17 until no further improvement can be made.
18.	.1MFD	"	105MC	"	Tune for max. output.	"	A23	Rock tuning cap. and adjust for maximum output.
19.	Dipole	See pre-alignment notes.	"	"	"	"	A24	Rock tuning cap. and adjust for maximum output.
20.	Dipole	"	92MC	"	"	"	FM RF Coil (184) & Ant. Coil (183)	Adjust per pre-alignment notes. Repeat Steps 18, 19 & 20 until no further improvement can be made.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Frequency modulated signal with 60∿, 450KC sweep. Use 120∿ sawtooth voltage for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	.1MFD	High side to Pin 6 (grid) 7H7 3rd IF Tube (5). Low side to chassis.	9.1MC (Freq. Mod.)	FM	Tuning cap. fully closed.	Vertical amp to Point A. Ground to chassis.	A12, A13	Short Pin 2 of FM1000 Tube to chassis. Short Pin 4 of FM1000 tube to junction of cap. (38 & 64) and resistor (129). Adjust A12 & A13 for maximum amplitude symmetry and coincidence of Pattern per Fig. A.
8.	.1MFD	High side to Pin 6 (grid) 7B7 2nd IF Tube. Low side to chassis.	"	"	"	"	A14, A15	Adjust for maximum amplitude, symmetry and coincidence.
9.	.1MFD	High side to Pin 6 (grid) 7H7 1st IF Tube (3). Low side to chassis.	"	"	"	"	A16, A17	"
10.	.1MFD	High side to Pin 1 (grid) 7F8. Low side to chassis.	"	"	"	"	A18, A19	Adjust for maximum amplitude, symmetry & coincidence. Remove only the short from Pin 2 of FM 1000 Tube.
11.	.1MFD	"	Adjust freq. for coincidence of pattern.	"	"	"	A20	Adjust for coincidence of two pips at peak of Pattern per Fig. B. Remove short from Pin 4 of FM1000 Tube
12.	.1MFD	"	Leave at exact setting of previous Step.	"	"	"	A21	Adjust for crossover of Pattern at horizontal sweep line per Fig. C.
13.	.1MFD	High side to Pin 2 (Tap on 183) of FM aerial socket. Low side to chassis.	105MC (freq. mod.)	"	8-13/16" from left edge of dial backplate.	"	A22	Short Pin 2 of FM1000 Tube to chassis. Adjust for coincidence of peaks per pattern of Fig. A.
14	.1MFD	"	88MC (freq. mod.)	"	3-5/8" from left edge of dial backplate.	"	FM Osc. Coil (192)	Compress or expand osc. coil slightly for coincidence of peaks per Pattern of Fig. A. Repeat steps 13 & 14 until no further improvement can be made.
15.	.1MFD	"	105MC	"	Tune for coincidence.	"	A23	Rock tuning cap. for coincidence while adjusting A23 for maximum amplitude of Pattern of Fig. A.
16.	Dipole	See Pre-alignment Note	"	"	"	"	A24	Rock tuning cap. for coincidence and adjust A24 for maximum amplitude of Pattern of Fig. A.
17	Dipole	"	88MC	"	"	"	FM RF Coil (184) ant. coil (183)	Compress or expand coils slightly for maximum amplitude of Pattern of Fig. A. Repeat steps 16 & 17 until no further improvement can be made. Remove short from Pin 2 of FM1000 tube.

SCOPE PAT TERNS

FIG. A

FIG. B

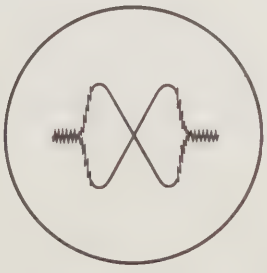
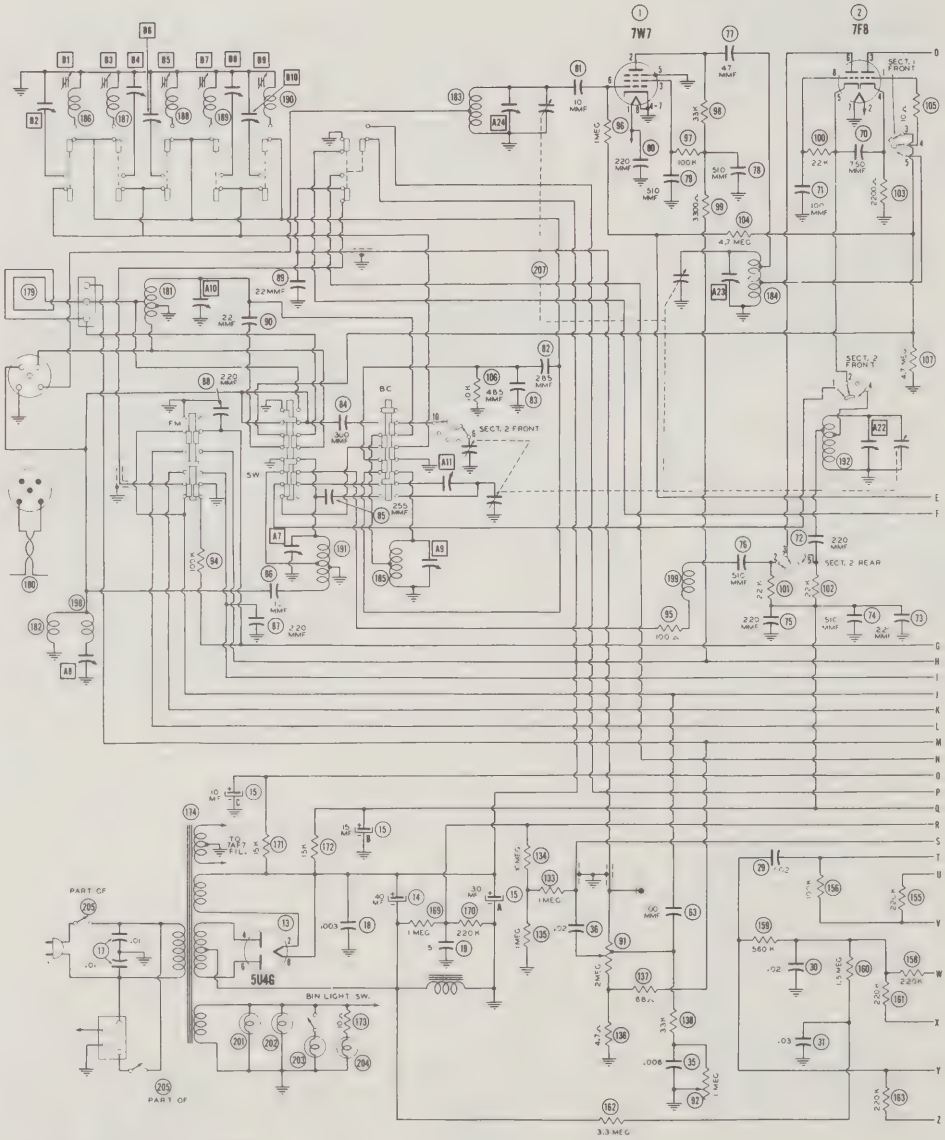


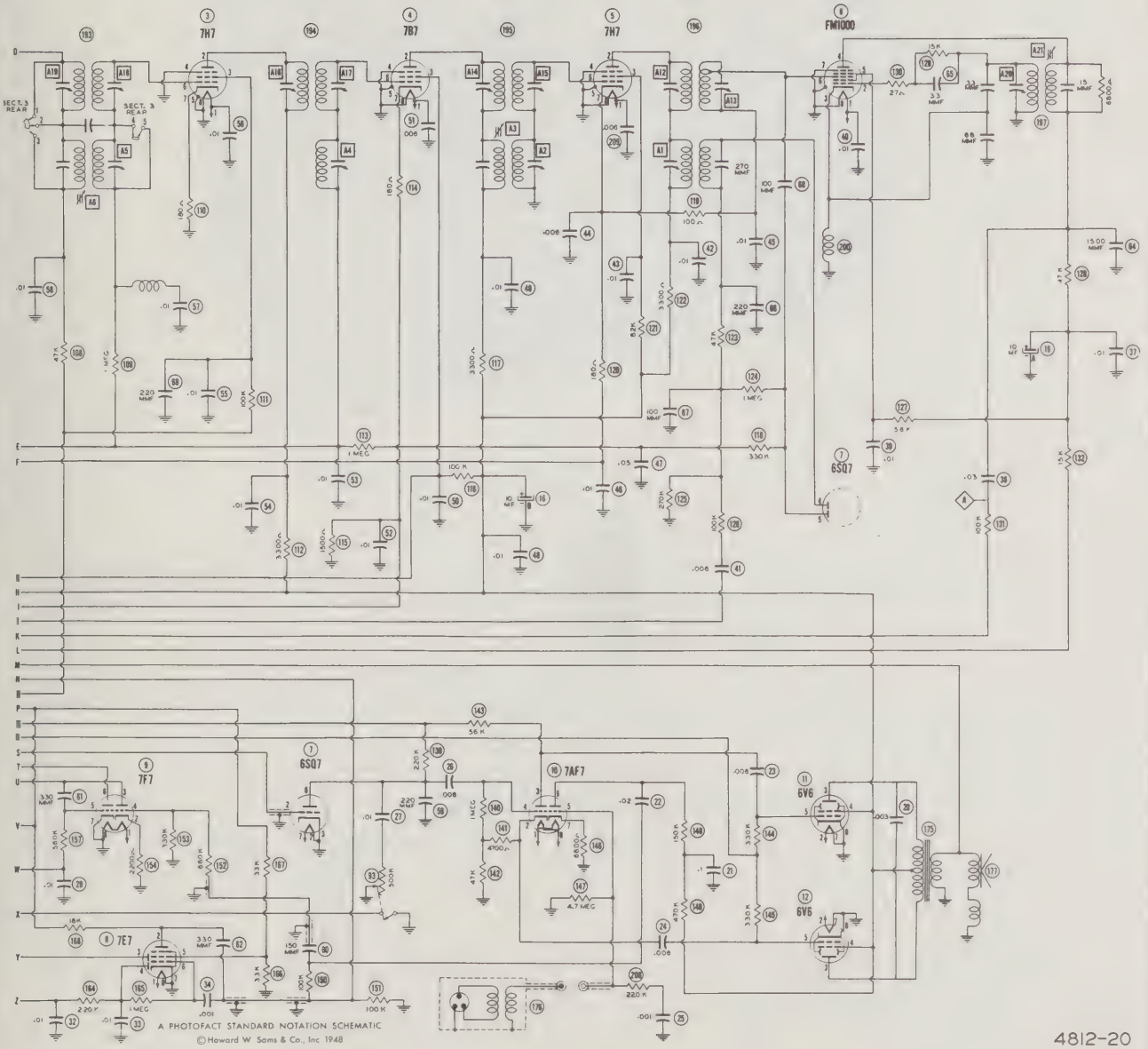
FIG. C



A PHOTOFACT STANDARD NOTATION SCHEMATIC

Howard W. Sams & Co., Inc. 1948

4812-20


7H7
7B7
7H7
FM1000
6SQ7
7F7
6SQ7
7AF7
6V6
6V6
7E7
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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4812-20

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION:

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7W7	6.8VAC	117VDC	87VDC	0V.	0V.	-.1VDC	0V.	0V.
	2	7F8	0V.	6.8VAC	125VDC	4VDC	0V.	100VDC	0V.	-5VDC§
	3	7H7	6.8VAC	250VDC	95VDC	0V.	0V.	0V.	1VDC	0V.
	4	7B7	6.8VAC	250VDC	100VDC	0V.	0V.	-.1VDC	5.5VDC	0V.
	5	7H7	6.8VAC	260VDC	90VDC	0V.	0V.	0V.	1.3VDC	0V.
‡	6	FM1000	6.8VAC	-.3VDC	0V.	205VDC	45VDC	1.3VDC	0V.	0V.
	7	6SQ7GT	0V.	-.5VDC	0V.	-.5VDC	-.6VDC	105VDC	6.8VAC	0V.
	8	7E7	6.8VAC	140VDC	-.6VDC	-.5VDC	105VDC	-.9VDC	0V.	0V.
	9	7F7	6.8VAC	1.3VDC	105VDC	0V.	-.9VDC	207VDC	0V.	0V.
	10	7AF7	3.25VAC	57VDC	145VDC	10VDC	0V.	35VDC	2VDC	3.25VAC
	1	6V6GT	0V.	6.8VAC	260VDC	265VDC	-8VDC	0V.	0V.	0V.
	2	6V6GT	0V.	6.8VAC	260VDC	265VDC	-8VDC	0V.	0V.	0V.
	3	5U4G	0V.	265VDC	5VAC	300VAC	0V.	300VAC	0V.	265VDC

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7W7	.05Ω	140KΩ	200KΩ	0Ω	0Ω	3 Meg.	0Ω	0Ω
	2	7F8	3.Meg.	.05Ω	160KΩ	2.2KΩ	.6Ω	140KΩ	0Ω	22KΩ
	3	7H7	.05Ω	103KΩ	215KΩ	0Ω	0Ω	3 Meg.	180Ω	0Ω
	4	7B7	.05Ω	103KΩ	200KΩ	0Ω	0Ω	2 Meg.	1.7KΩ	0Ω
	5	7H7	.05Ω	103KΩ	180KΩ	0Ω	0Ω	14Ω	180Ω	0Ω
‡	6	FM1000	.05Ω	15KΩ	8Ω	162KΩ	170KΩ	280Ω	0Ω	0Ω
	7	6SQ7GT	0Ω	2 Meg.	0Ω	350KΩ	1.2 Meg	335KΩ	.05Ω	0Ω
	8	7E7	.05Ω	60KΩ	800KΩ	1.2 Meg.	30KΩ	2.2 Meg.	0Ω	0Ω
	9	7F7	.05Ω	2.2KΩ	270KΩ	330KΩ	1 Meg.	150KΩ	0Ω	0Ω
	10	7AF7	.05Ω	50KΩ	170KΩ	1.5 Meg.	4.7 Meg.	620KΩ	6.8KΩ	.05Ω
	1	6V6GT	0Ω	.05Ω	100KΩ	100KΩ	500KΩ	250KΩ	0Ω	0Ω
	2	6V6GT	0Ω	.05Ω	100KΩ	100KΩ	500KΩ	0Ω	0Ω	0Ω
	3	5U4G	0Ω	100KΩ	3Ω	500Ω	INF.	500Ω	0Ω	100KΩ

VOLTAGE AND RESISTANCE READINGS ON TUBES 8 & 9 TAKEN WITH "SCRATCH" ELIMINATOR SWITCH CLOSED. ALL CONTROLS AT MAXIMUM.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS			
ANTENNA TO CONVERTER GRID	15X		600KC
CONVERTER GAIN	4X	IN OUT	600KC 455KC
1st IF TRANS.	4.5X		455KC
1st IF TUBE	.05X		455KC
PLATE 1st IF TO GRID 2nd IF TUBE	70X		455KC
2nd IF TUBE	10X		455KC
3rd IF TRANS.	1.4X		455KC
3rd IF TUBE	240X		455KC
3th IF TRANS.	.6X		455KC
PHONO AMP.	9X		400 ∿
1st AUDIO	45X		400 ∿
PHASE INV.	.9X		400 ∿
OUTPUT	25X		400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

PHILCO MODEL 49-601
BATTERY OPERATED

PHILCO MODEL 49-601
BATTERY OPERATED

PHILCO MODEL 49-601

TRADE NAME	Philco, Model 49-601
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output
POWER SUPPLY	7.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	50MA @ 7.5 Volts DC and 12MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to ext. antenna lead. Low side to chassis.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3	Adjust for maximum output.
2		Loop	1600KC	1600KC reference mark at high freq. end of dial backplate.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver.
3		"	1500KC	Tune for maximum output.	"	A5	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 7/48-#4812-21 SET #42-FOLDER #21

PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 49-601
BATTERY OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	10	150	30-2575-21		BRD3315	DSB-2x30-150	TA-230	Filter-Red
B	30	25						" -Br.
6	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	Output Plate Bypass
7	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	Audio Coupling
8	.002	200	61-0162	484-002	DT6D2	ST-6-002	TC-22	" "
9	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AF Screen Bypass
10	.25	100	61-0125	484-.25	DT2P25	ST-2-.25	TC-2	Filament Bypass
11	.1	200	61-0113	484-.1	DT2P1	ST-2-1	TC-1	Screen Bypass
12	.05	200	61-0122	484-05	DT2S5	ST-2-05	TC-15	AVC Filter
13	220	300	62-122001001	1468-0002	5W5T2	MO.5-32	1FM-32	Output Grid Bypass-Cer.
14	3	300	30-1221					Feedback-Cer.
15	1.5	300	30-1221-3					" "
16	5	300	30-1224-5	1468-000005	5W5V5	MO.5-55	MS-55	Ext. Ant. Coupling-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½	33-5538-28	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

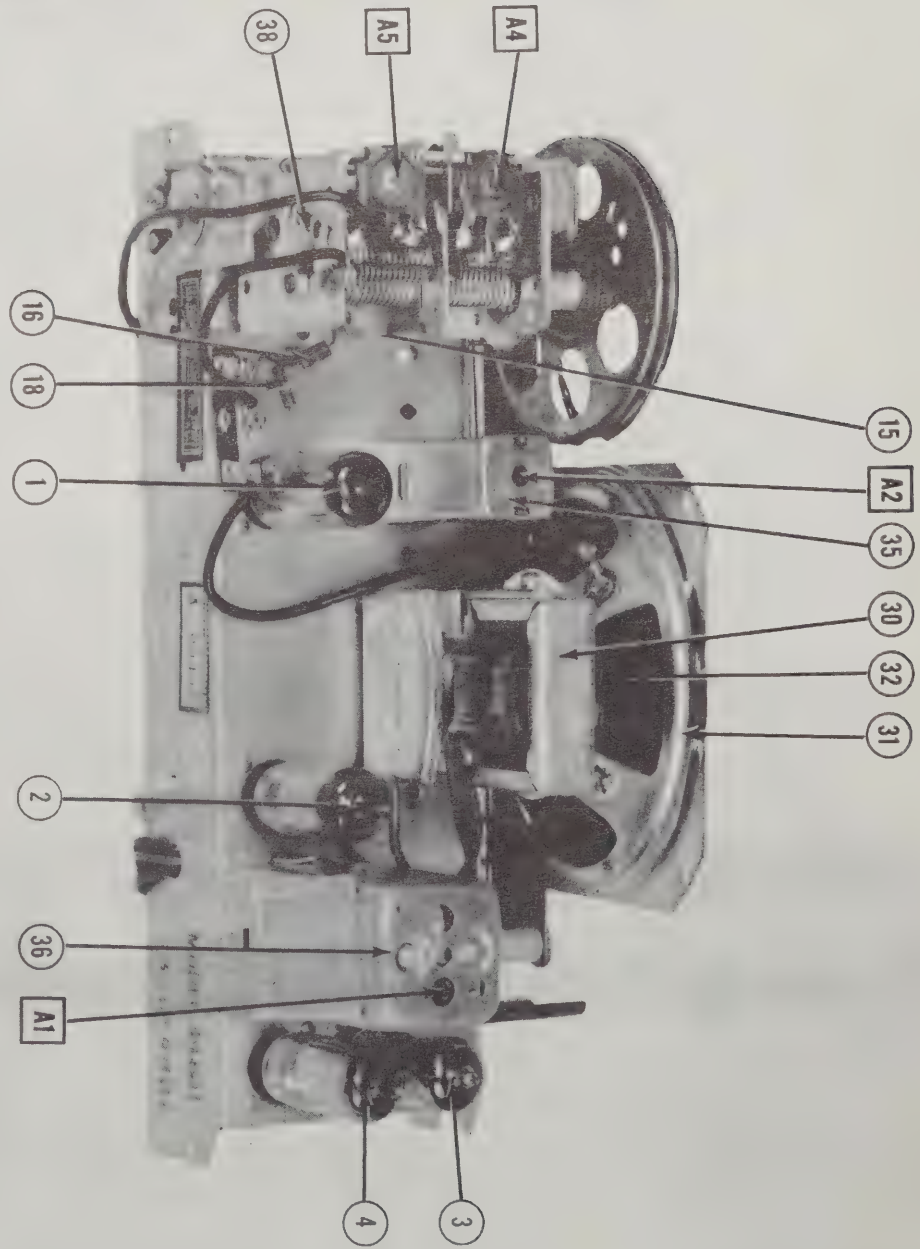
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
18	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Ant. Loading
19	10 Meg.	½	66-3103340	BTS-10 Meg.	Br.-Blk.-Blue Conv. Grid-See Note
20	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Osc. Grid
21	6.8 Meg.	½	66-5103340	BTS-6.8 Meg.	Blue-Gray-Grn. AVC Network
22	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Screen Dropping
23	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
24	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
25	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
26	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
27	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. " "
28	680Ω	½	66-1683340	BTS-680	Blue-Gray-Br. Filament String
29	330Ω	½		BW-½-330	Or.-Or.-Br. Series Vol. Cont.-See Note

Note-Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	10KΩ	3.9Ω	675Ω	.6Ω	Part of 36-1627-1			A-2998	Bend mounting tabs down and mount on original brkt.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
31	FIELD PM	VC IMP. 3.9Ω	36-1627-1	ST-113* Mod. P4-X	4A15	*Drill and tap magnet frame.
32	CONE DIA. 4"	VC DIA. 1/2"				

R F COILS

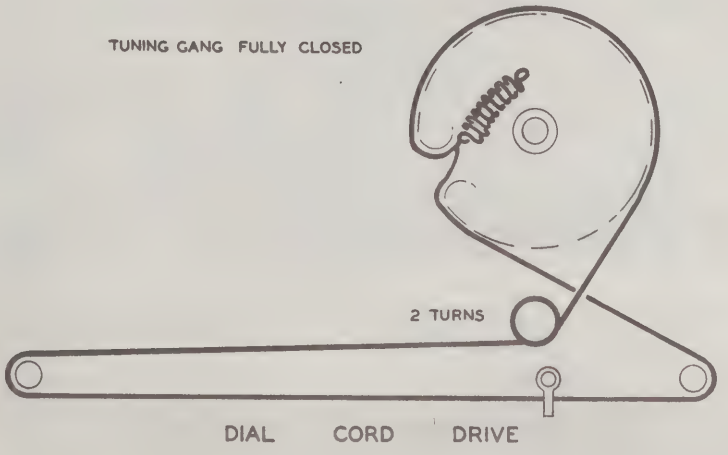
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.	
33	Loop Ant.		3.3Ω	32-4274		
34	Osc. Coil	2.6Ω	6Ω	32-4282	14-1060	Add 50 MMFD from osc. grid to high side of tuning cap.
35	Input IF	17Ω	11Ω	32-4160	16-6668	
36	Output IF	40Ω		32-3967-2	16-6670	

BATTERIES

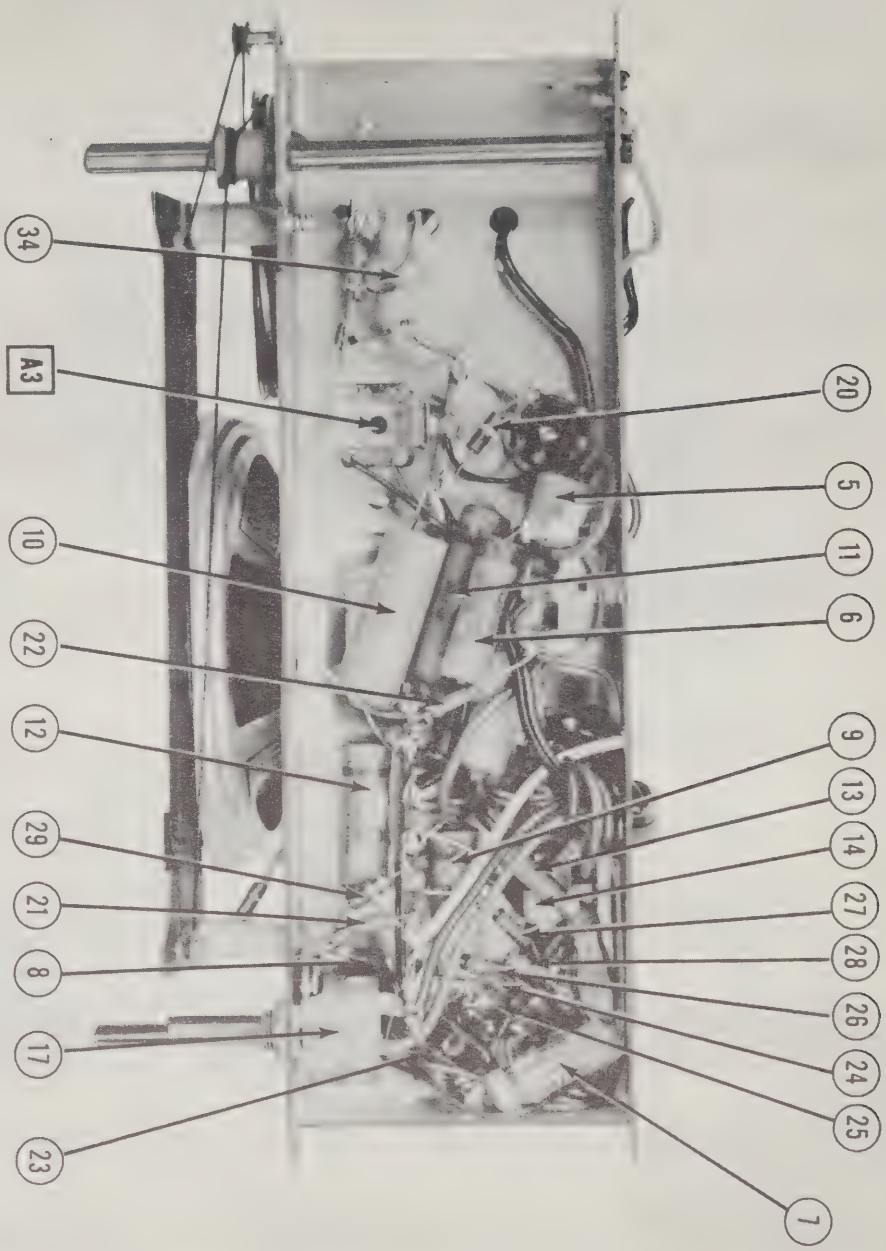
ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
37	7.5V "A" 90V "B"	P-361						T5Z60	

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
38	2 Gang Var. Cap.	31-2727-2	(27-496MMF, 24-165MMF)
	Dial Pointer	56-4362-2FCP	
	Knob	56-4557	Maroon
	"	54-4557-1	Tan
	"	54-4557-2	Ivory
	"	54-4557-3	Green

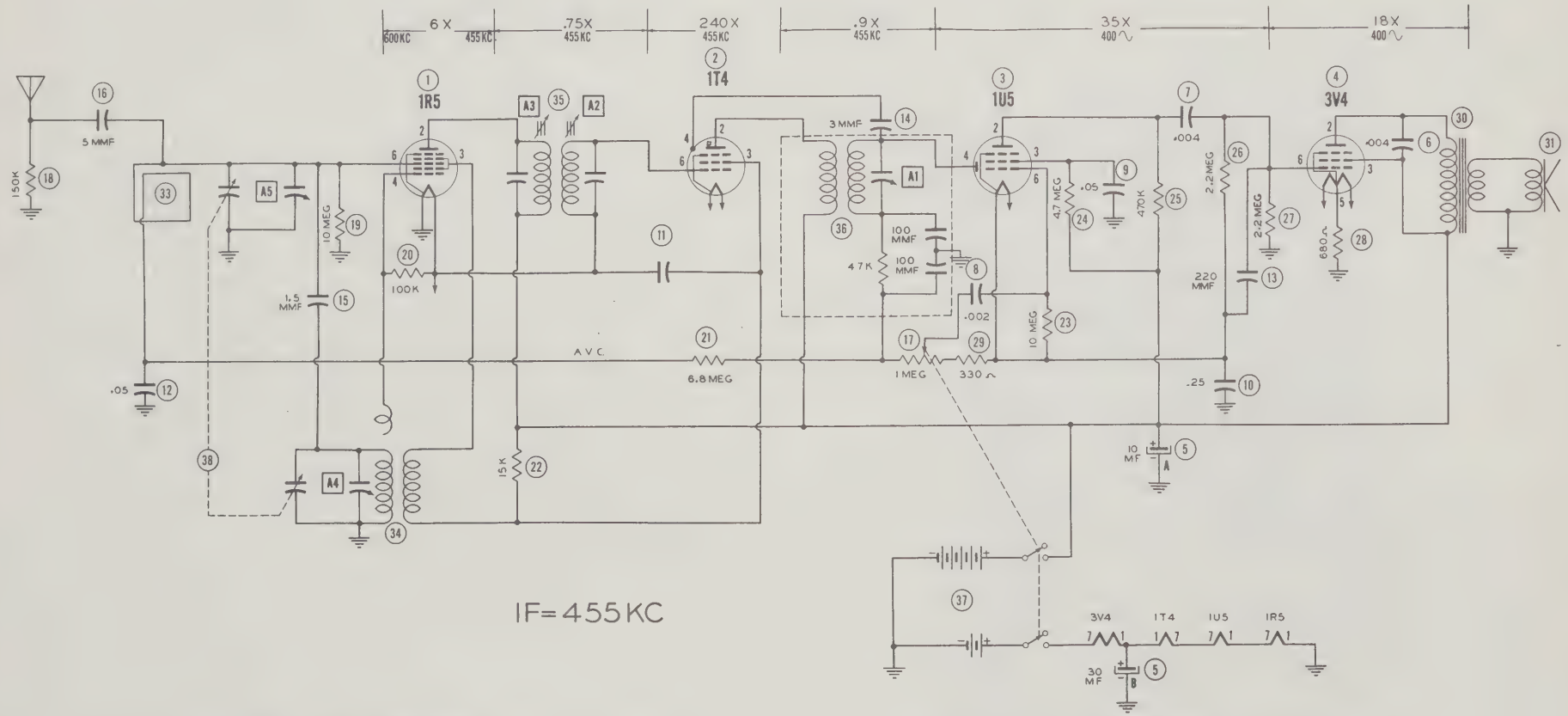


CHASSIS—BOTTOM VIEW



PHILCO MODEL 49-601
BATTERY OPERATED

PHILCO MODEL 49-601
BATTERY OPERATED



IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	83VDC	50VDC	-9.6VDC§	0V.	0V.	1.5VDC
2	1T4	3VDC	83VDC	50VDC	0V.	3VDC	1.5VDC	4.4VDC
3	1U5	1.5VDC	40VDC	22VDC	.2VDC	0V.	0V.	3VDC
4	3V4	4.4VDC	80VDC	83VDC	.1VDC	5.7VDC	.1VDC	7VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	130KΩ	145KΩ	100KΩ	0Ω	8 Meg.	*
2	1T4	*	130KΩ	145KΩ	INF.	*	*	*
3	1U5	*	800KΩ	4.8 Meg.	1 Meg.	INF.	10 Meg.	*
4	3V4	*	130KΩ	130KΩ	1.2 Meg.	*	1.2 Meg.	*

DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-21

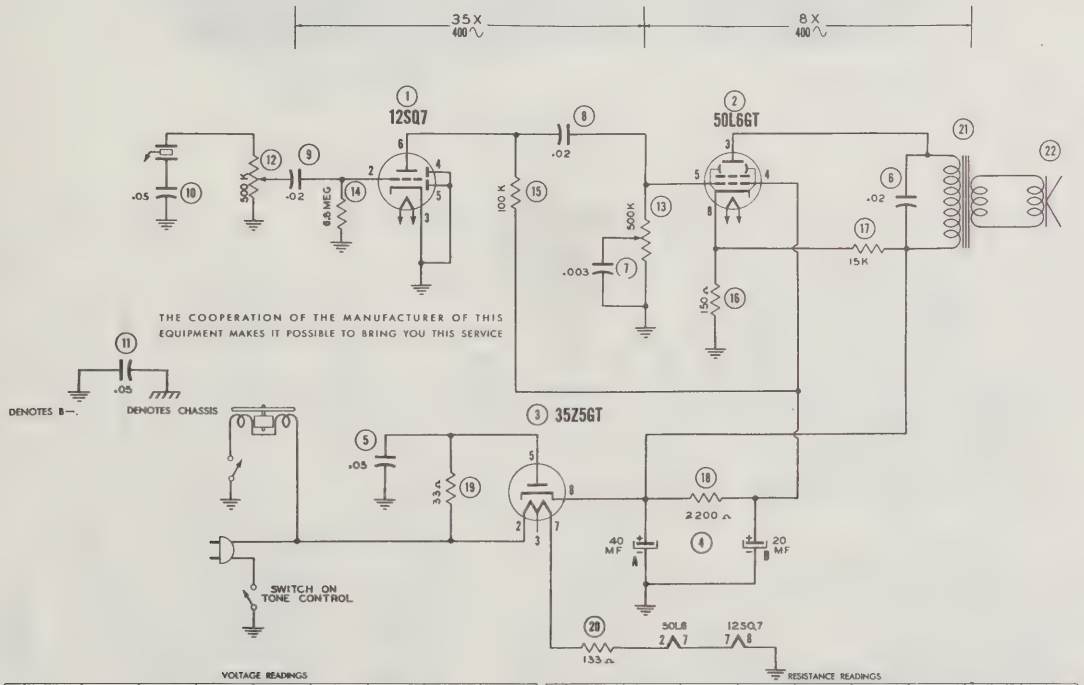
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting AVC to Pin 1 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE MODELS 8153 (Ch. 109.635), 8153A (Ch. 109.635-1)

SILVERTONE MODEL 8153A

TRADE NAME	Silvertone, Models 8153 (Ch. 109.635), 8153A (Ch. 109.635-1)
MANUFACTURER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC Operated Automatic Record Player with 3 Tube Amplifier.
TUBES (THREE)	Types, 12SQ7GT AF Amp., 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .24 Amp. @ 117 Volts AC



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SQ7	0V.	-.7VDC	0V.	-.7VDC	0V.	85VDC	13VAC	0V.
2	50L6GT	0V.	60VAC	116VDC	120VDC	0V.	120VDC	13VAC	7.5VDC
3	35Z5	0V.	117VAC	110VDC	0V.	115VDC	0V.	80VAC	127VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SQ7	INF.	6.8 Meg.	0Ω	INF.	0Ω	110KΩ	12Ω	0Ω
2	50L6GT	INF.	60Ω	15KΩ	15KΩ	500KΩ	15KΩ	12Ω	150Ω
3	35Z5	INF.	236Ω	230Ω	INF.	275Ω	INF.	200Ω	15KΩ

A PHOTOFACT STANDARD NOTATION SCHEMATIC

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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4812-22

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, no signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. **Indianapolis 7, Indiana**

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DATE 7/48-#4812-22 SET #42-FOLDER #22

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AF Amp.	12SQ7GT	12SQ7GT	8Q	
2	Power Output	50L6GT	50L6GT	7AC	
3	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
4A	40	150	DA8948	AF444D*	UP4215	DY-4020-150	EL-24	■ Filter
B	20	150						▲ "
5	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
6	.02	400		484-02	DT2S5	ST-4-02	TC-12	Output Plate Bypass
7	.003	600		684-003	DT6D3	ST-6-003	TC-23	Tone Compensation
8	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
9	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
10	.05	400		484-05	DT4S5	ST-4-05	TC-15	Phono Isolation
11	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Isolation

*Parallel two sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
12A	100KΩ	½	DB55533-1	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 12A per instructions
13A	500KΩ	½	DB55578-1	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 13A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
14	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
15	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
16	150Ω	1		BW-1-150	Br.-Grn.-Br. Output Cathode
17	15KΩ	1		BTA-15K	Br.-Grn.-Or. Bleeder
18	2200Ω	½		BTS-2200	Red-Red-Red Filter
19	33Ω	½		BW-½-33	Or.-Or.-Blk. Rectifier Ballast
20	133Ω	5	DA9528	ABA-150	Line Dropping-See Note

Note-On IRC replacement set slider at 133Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
21	2000Ω	3.0Ω	255Ω	.7Ω	B-51578-2	A-3876	T22S45	A-2928	

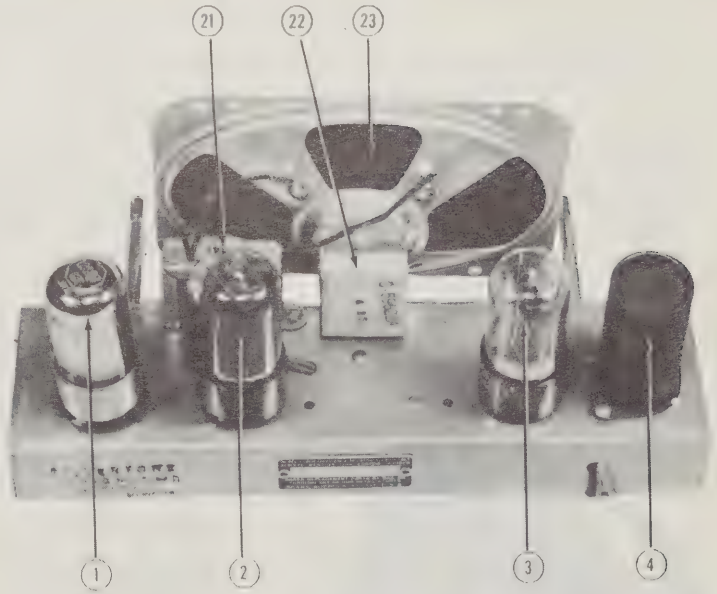
SPEAKER

ITEM No.	RATINGS	REPLACEMENT DATA: SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
22	FIELD RES. / PM — VC IMP. 3.0Ω	C-59622		46A1*	*Drill new mounting holes.
23	CONE DIA. 4"x6" — VC DIA. 1/2"				

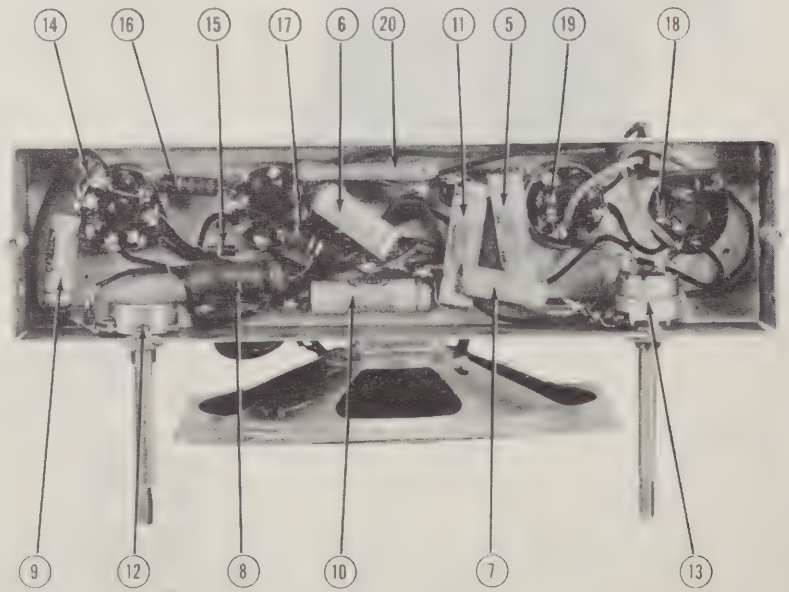
MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
	Cabinet	DD-54463-2	
	Knob	DC-59614-1	(On-off, Tone & Volume)

CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



PHOTOFACT* Folder

*TRADE MARK

STEWART-WARNER MODELS A61P1 (Code #9036-A), A61P2 (Code #9036-B), A61P3 (Code #9036-C) BATTERY-LINE OPERATED

STEWART-WARNER MODELS A61P1 (Code #9036-A), A61P2 (Code #9036-B), A61P3 (Code #9036-C) BATTERY-LINE OPERATED

STEWART-WARNER MODELS A61P1 (Code #9036-A), A61P2 (Code #9036-B), A61P3 (Code #9036-C) BATTERY-LINE OPERATED

STEWART-WARNER MODEL A61P1

TRADE NAME	Stewart-Warner, Models A61P1 (Code 9036-A), A61P2 (Code 9036-B), A61P3 (Code 9036-C)
MANUFACTURER	Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 1A7GT Converter, 1N5GT IF Amp., 1H5GT Det.-AVC-AF, 3Q5GT Power Output, (2) 35Z5GT Rectifier.
POWER SUPPLY RATING	110-120 Volts AC-DC or 9 Volt "A" Supply and 90 Volt "B" Supply in Pack Form .38 Amp. @ 117 Volts AC or 51MA @ 9 Volts DC and 10.4MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Disconnect and remove battery from cabinet. Remove the two plug buttons which are located at bottom of cabinet so that a long bladed screwdriver may be inserted to remove chassis hold-down screws. After removing these screws be sure to replace and reconnect battery as its position affects loop alignment.

Partially withdraw chassis from cabinet so as to obtain access to trimmer adjustments. Do not remove chassis from cabinet as position of chassis to loop is important.

Set "charge-Batt.-AC-DC" switch in "AC-DC" position.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver.
2		"	1600KC	"	"	A4	Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A5	" " " "

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DATE 7/48-#4812-23 SET #42-FOLDER #23

PARTS LIST AND DESCRIPTIONS

STEWART-WARNER
MODEL A61P1

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1A7GT	1A7GT	7Z	
2	IF Amp.	1N5GT	1N5GT	6Y	
3	Det.-AVC-AF	1H5GT	1H5GT	5Z	
4	Power Output	3Q5GT	3Q5GT	7AP	
5	Rectifier	35Z5GT	35Z5GT	6AD	
6	"	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STEWART-WARN. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	200	500714	AF444D	UP22215	DY-3x20-150	EL-320	Filter
B	20	200						"
C	20	150						"
8	4	150	502547	PRS150-4	BR415	M-8-150	UT-41	Conv. Screen Bypass
9	50	25	502527	PRS50/25	BR255	M-50-25	TA-50	Filament Bypass
10	.1	200	502155	484-.1	DT2P1	ST-2-1	TC-1	RF Bypass Pwr. Supply
11	.1	200	502155	484-.1	DT2P1	ST-2-1	TC-1	Neon Indicator Bypass
12	.002	600	502453	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
13	.01	400	502151	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
14	.1	200	502155	484-.1	DT2P1	ST-2-1	TC-1	AF Plate Decoupling
15	.004	400	502156	484-004	DT6D4	ST-6-004	TC-24	Audio Coupling
16	.05	200	502153	484-05	DT2S5	ST-4-05	TC-15	IF Grid Filter
17	.1	200	502155	484-.1	DT2P1	ST-2-1	TC-1	Filament Bypass
18	.05	200	502153	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
19	.05	200	502153	484-05	DT2S5	ST-4-05	TC-15	Filament Bypass
20	110	500	502160	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
21	50		502159	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter
22	50		502159	1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
23	50		502159	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
24	2		502411					Feedback
25	110	500	502160	1468-0001	5W5T1	MO.5-31	1FM-31	Ext. Ant. Coupling
63	.05	200	502153	484-05	DT4S5	ST-4-05	TC-15	Line Filter

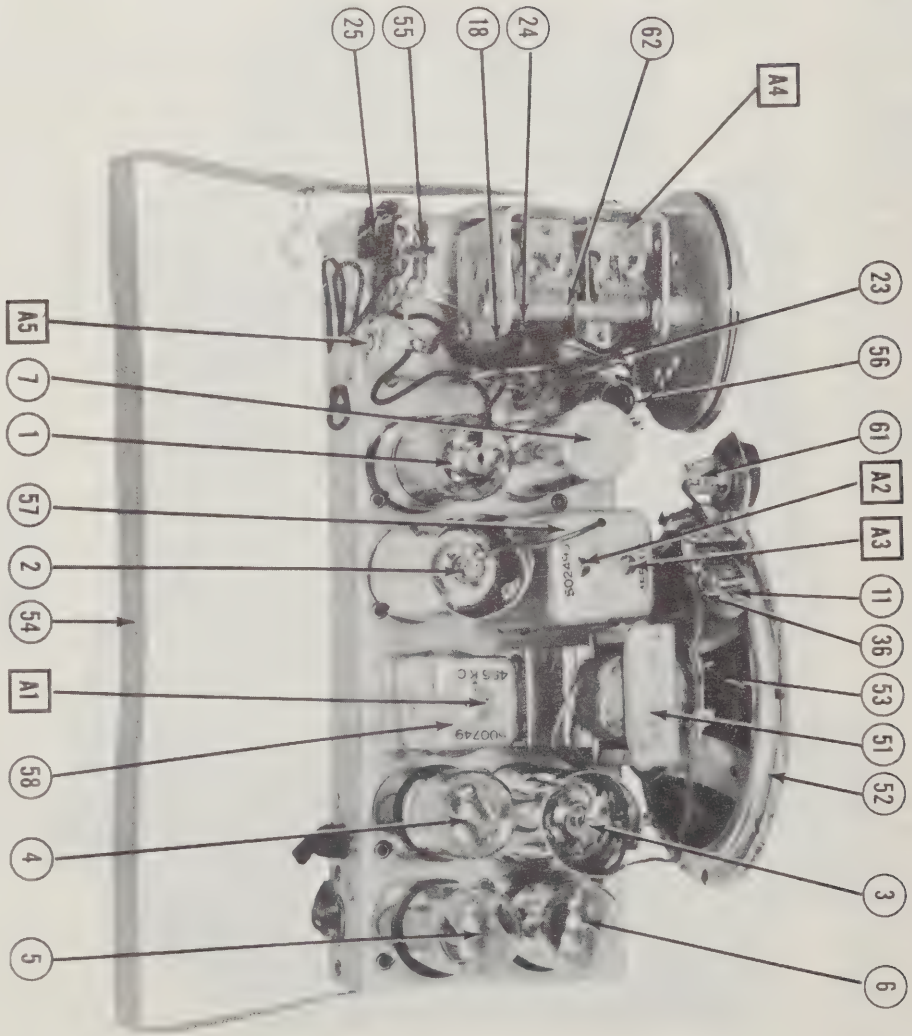
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
26A	1 Meg.	½	502525	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 26A per instructions
C	Switch		" "	45	SW-A4	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
27	220KΩ	½	502133	BTS-220K	Red-Red-Yl. Osc. Grid
28	33KΩ	½	504710	BTS-33K	Or.-Or.-Or. Conv. Screen
29	10 Meg.	½	502136	BTS-10 Meg.	Br.-Blk.-Blue IF Grid
30	3.3 Meg.	½	502269	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
31	100KΩ	½	502132	BTS-100K	Br.-Blk.-Yl. Diode Filter
32	3.3 Meg.	½	502269	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
33	1 Meg.	½	502268	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
34	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AF Plate Decoup.
35	2.2 Meg.	½	502135	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
36	3.3 Meg.	½	502269	BTS-3.3 Meg.	Or.-Or.-Grn. Series Neon Ind.
37	1830Ω	5	500712	ABA-2000	Filament Dropping-See Note 1
38	27Ω	½	503134	BW-½-27	Red-Vi.-Blk. Series Filament
39	330Ω	½	502457	BW-½-330	Or.-Or.-Br. Filament String
40	430Ω	½	502458	BW-½-430	Yl.-Or.-Br. " "
41	15KΩ	½	502266	BTS-15K	Br.-Grn.-Or. Voltage Dropping
42	6800Ω	½	502459	BTS-6800	Blue-Gray-Red " "
43	330Ω	½	502457	BW-½-330	Or.-Or.-Br. " "
44	27Ω	½	503134	BW-½-27	Red-Vi.-Blk. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	STEWART-WARNER PART No.	IRC PART No.	
45A	1460Ω	10	500715	AB-1450	Bleeder
B	155Ω	1		BT-1-150	"
C	310Ω	10		ABa-350	Line Dropping-See Note 2
46	47Ω	1	502454	BW-1-47	Yl.-Vi.-Blk. Rectifier Ballast
47	47Ω	1	502454	BW-1-47	Yl.-Vi.-Blk. " "
48	220Ω	½	502456	BW-½-220	Red-Red-Br. Filament String
49	220Ω	½	502456	BW-½-220	Red-Red-Br. " "

Note 1-On IRC replacement set slider 70Ω from end.
Note 2-On IRC replacement set slider 40Ω from end.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	STEWART-WARNER PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
50	.062A	220Ω	4 Henries	502528	C-1080*	T-20C52*		*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		STEWART-WARNER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
51	10KΩ	3.7Ω	465Ω	.5Ω	Part of R502491	A-3848#	T22847#	A-2998#	#Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			STEWART-WARNER PART No.	JENSEN PART No.	QUAM PART No.	
52	FIELD	VC IMP.	R502491	ST-105 Mod. P5-X	5A15	
	PM	3.7Ω				
53	CONE DIA.	VC DIA.				
	4-13/16"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	STEWART-WARNER PART No.	MEISSNER PART No.	
54	Loop Ant.		1.2Ω	505440		
55	Ant. Load. Coil		3.3Ω	505781		
56	Osc. Coil	2.5Ω	5.5Ω	502498	14-1060	
57	Input IF	16Ω	3Ω	502495		
58	Output IF	40Ω	40Ω	500749		

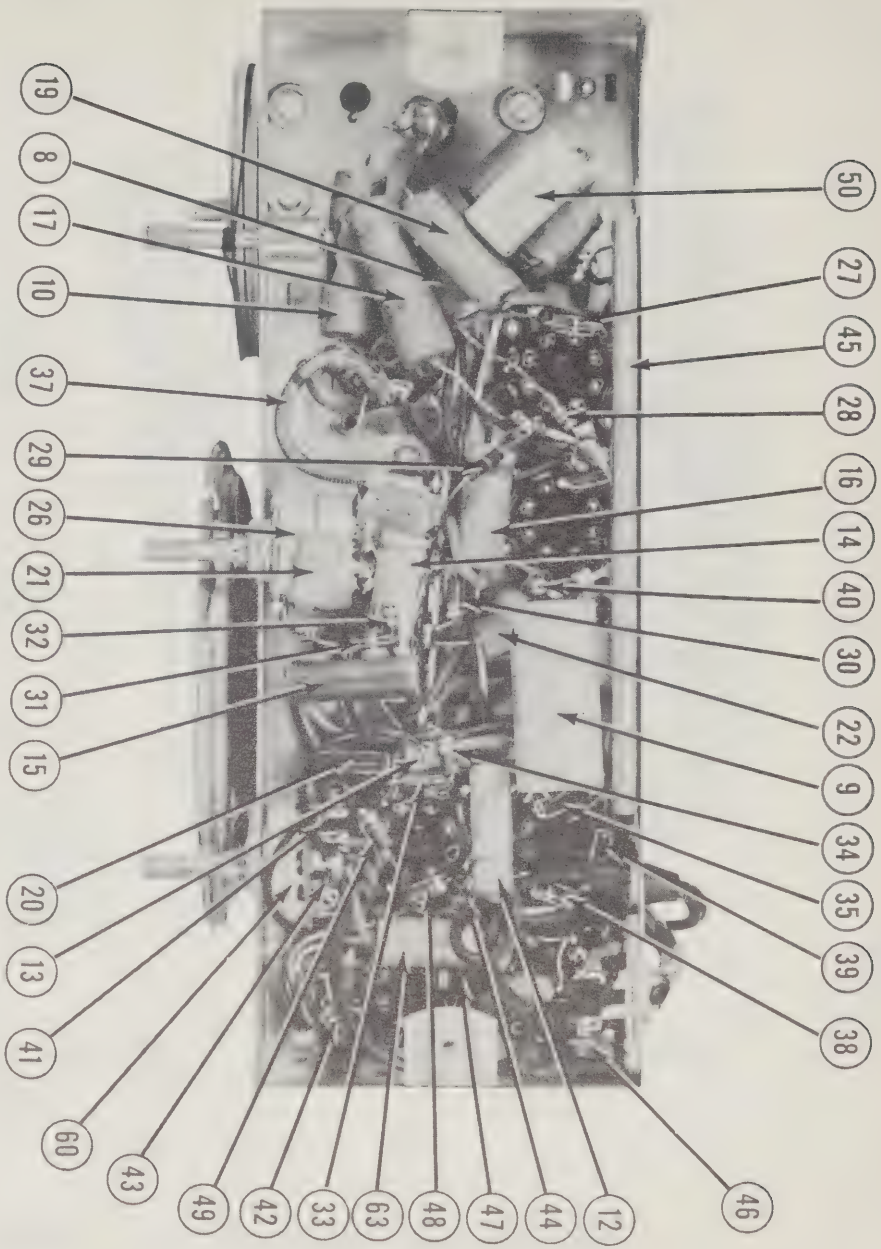
BATTERIES

ITEM No.	VOLTAGE	STEWART-WARNER PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
59	9V "A" 90V "B"				#753			F6A60	

MISCELLANEOUS

ITEM No.	PART NAME	STEWART-WARNER PART No.	NOTES
60	Switch	502526	AC/DC-Batt.-Charge
61	Indicator	500713	Neon
62	2 Gang Var. Cap.	502494	(14-495MMF, 25-195MMF)
A5	Trimmer	119132	Ant. Adj.
	Dial Pointer	505691	Brown
	" "	505685	Black

CHASSIS—BOTTOM VIEW



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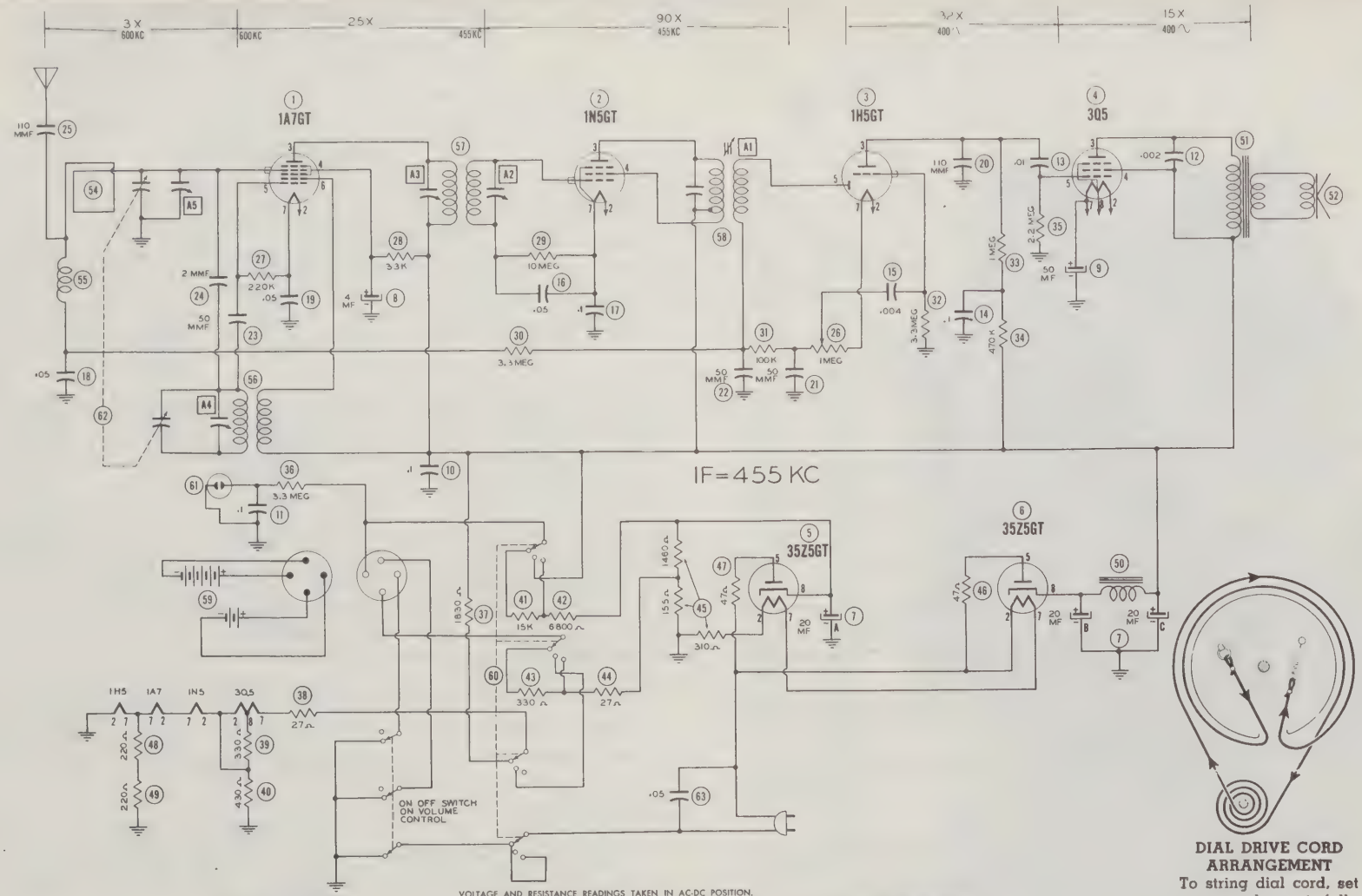
SET #42-FOLDER #23

STEWART-WARNER MODEL A61P1

STEWART-WARNER MODEL A61P1



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	0V.	2.9VDC	102VDC	68VDC	-17VDC§	102VDC	1.4VDC	0V.	.04VDC
2	1N5GT	0V.	4.4VDC	102VDC	102VDC	0V.	1.2VDC	2.9VDC	0V.	.05VDC
3	1H5GT	0V.	0V.	52VDC	83VDC	0V.	11VDC	1.4VDC	.7VDC	0V.
4	3Q5GT	8.5VDC	7.2VDC	96VDC	103VDC	0V.	0V.	4.4VDC	5.9VDC	-
5	35Z5GT	117VAC	117VAC	110VAC	0V.	113VAC	0V.	62VAC	117VDC	-
6	35Z5GT	113VDC	47VAC	54VAC	11VDC	113VAC	0V.	62VAC	113VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	0Ω	*	2KΩ	2KΩ	2KΩ	2KΩ	*	INF.	4.4 Meg.
2	1N5GT	0Ω	*	2KΩ	2KΩ	INF.	2KΩ	*	INF.	10 Meg.
3	1H5GT	0Ω	0Ω	1.4 Meg.	2KΩ	1.1 Meg.	150Ω	*	110Ω	3.3 Meg.
4	3Q5GT	80Ω	*	2KΩ	2KΩ	2.2 Meg.	0Ω	*	*	-
5	35Z5GT	380Ω	380Ω	375Ω	INF.	2KΩ	INF.	340Ω	2KΩ	-
6	35Z5GT	8.4KΩ	310Ω	315Ω	180Ω	420Ω	INF.	340Ω	1.6KΩ	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

DIAL DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully open position and use following parts:

114955	Clip on end of cord
117057	Cord (3 feet)
119087	Ring for dial cord
161384	Tension Spring

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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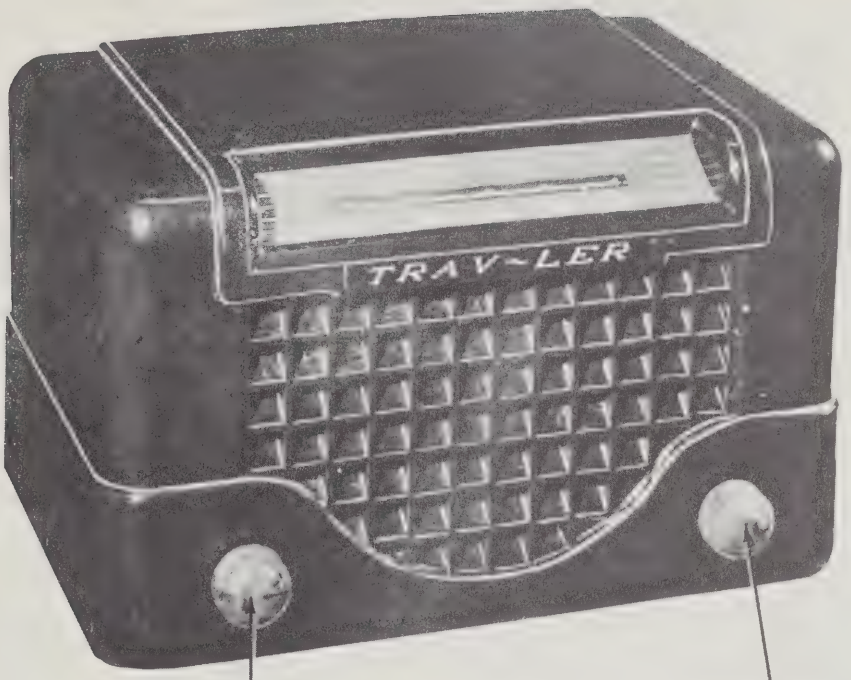
4812-23

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 1.5 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

TRAV-LER MODEL
5066



TRAV-LER MODEL
5066

TRAV-LER MODEL 5066

TRADE NAME	Trav-Ler, Model 5066
MANUFACTURER	Trav-Ler Radio & Tele. Corp., 571 W. Jackson, Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SK7GT RF Amp., 12SA7 Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear section of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.1 MFD	"	1720KC	"	"	A5	Adjust for maximum output.
3	200MMFD	High side to ext. ant. lead. Low side to B-.	1400KC	Tune for maximum output.	"	A6	" " " "

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DATE 7/48-#4812-24 SET #42-FOLDER #24

PARTS LIST AND DESCRIPTIONS

TRAV-LER MODEL 5066

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12SK7GT	12SK7GT	8N	
2	Converter	12SA7	12SA7	8R	
3	IF Amp.	12SK7GT	12SK7GT	8N	
4	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	EC-14	PRSA150/40-40	EZ443150*	DSB-403020-150	TA-440	Filter -Blue
B	40	150					"	-Red
C	20	150		PRS150/20			UT-201	" -Yl.
8	25	25	EC-2	PRS25/25	BR252A	M-25-25	TA-25	Cathode Bypass
9	.05	400	PC-5	484-05	DT4S5	ST-4-05	TC-15	Line Filter
10	.01	400	PC-7	484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
11	.005	600	PC-6	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
12	.05	400	PC-5	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
13	.01	400	PC-7	484-01	DT4S1	ST-4-01	TC-11	Ext. Ant. Isolation
14	.1	400	PC-8	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
15	6000	300		1467-006	1D5D6	MW.-5-26	1FM-26	Audio Coupling
16	500	500	MC-5	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
17	150	500		1468-00015	5W5T15	MO.5-315	1FM-315	Diode RF Filter
18	50	500	MC-4	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
19	150	500		1468-00015	5W5T15	MO.5-315	1FM-315	RF Coupling

*Omit bypass section.

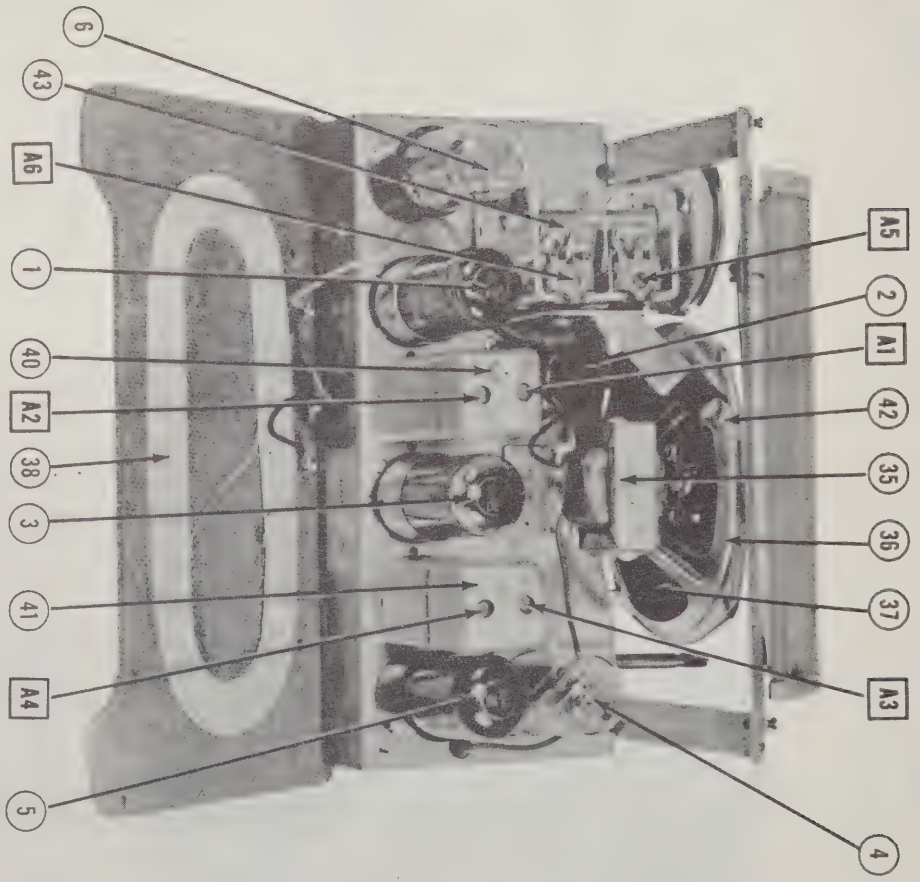
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	1 Meg.	½	VC-13	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 20A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRAV-LER PART No.	IRC PART No.	IDENTIFICATION CODES
21	3900Ω	½	1R-22	BTS-3900	Or.-White-Red RF Plate Load
22	22KΩ	½	1R-9	BTS-22K	Red-Red-Or. Osc. Grid
23	47KΩ	½	1R-10	BTS-47K	Yl.-Vi.-Or. Conv. Grid
24	3.3 Meg.	½	1R-23	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
25	47KΩ	½	1R-10	BTS-47K	Yl.-Vi.-Or. Diode Filter
26	2.2 Meg.	½	1R-13	BTS-2.2 Meg.	Red-Red-Grn. AF Grid
27	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
28	470KΩ	½	1R-11	BTS-470K	Yl.-Vi.-Yl. Output Grid
29	220Ω	½	1R-5	BW-½-220	Red-Red-Br. Output Cathode
30	330Ω	½	1R-21	BW-½-330	Or.-Or.-Br. Filter
31	220Ω	½	1R-5	BW-½-220	Red-Red-Br. "
32	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Surge Limiter
33	33Ω	½	1R-17	BW-½-33	Or.-Or.-Blk. Rect. Ballast
34	220KΩ	½	1R-20	BTS-220K	Red-Red-Yl. Line Isolation

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRAV-LER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
35	2000Ω	3.3Ω	175Ω	.6Ω	Part of SPK-12	A-3876#	T22S45#	A-2528#	#Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRAV-LER PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105		
36	PM	3.3Ω	SPK-12	Mod. P5-X	5A15	
	CONE DIA.	VC DIA.				
37	4½"	1/2"				

R F COILS

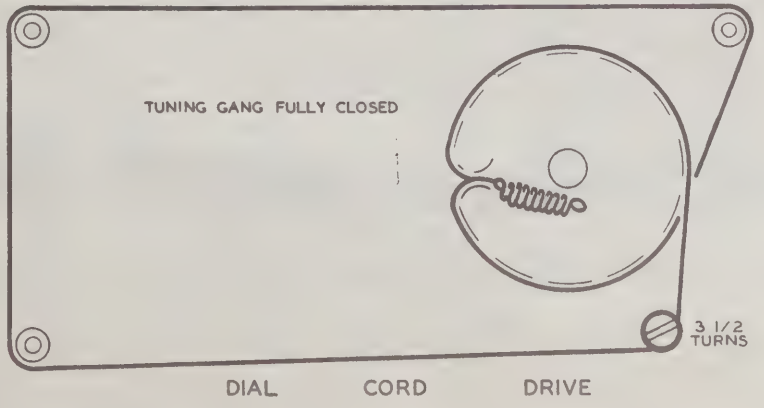
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	
38	Loop Ant.	.1Ω	2Ω	LL-16		
39	Osc. Coil	.8Ω	7.7Ω	LO-10	14-1060	
40	Input IF	20.5Ω	20.5Ω	LI-6	16-6666	
41	Output IF	20.5Ω	20.5Ω	LI-7	16-6667	

DIAL LIGHT

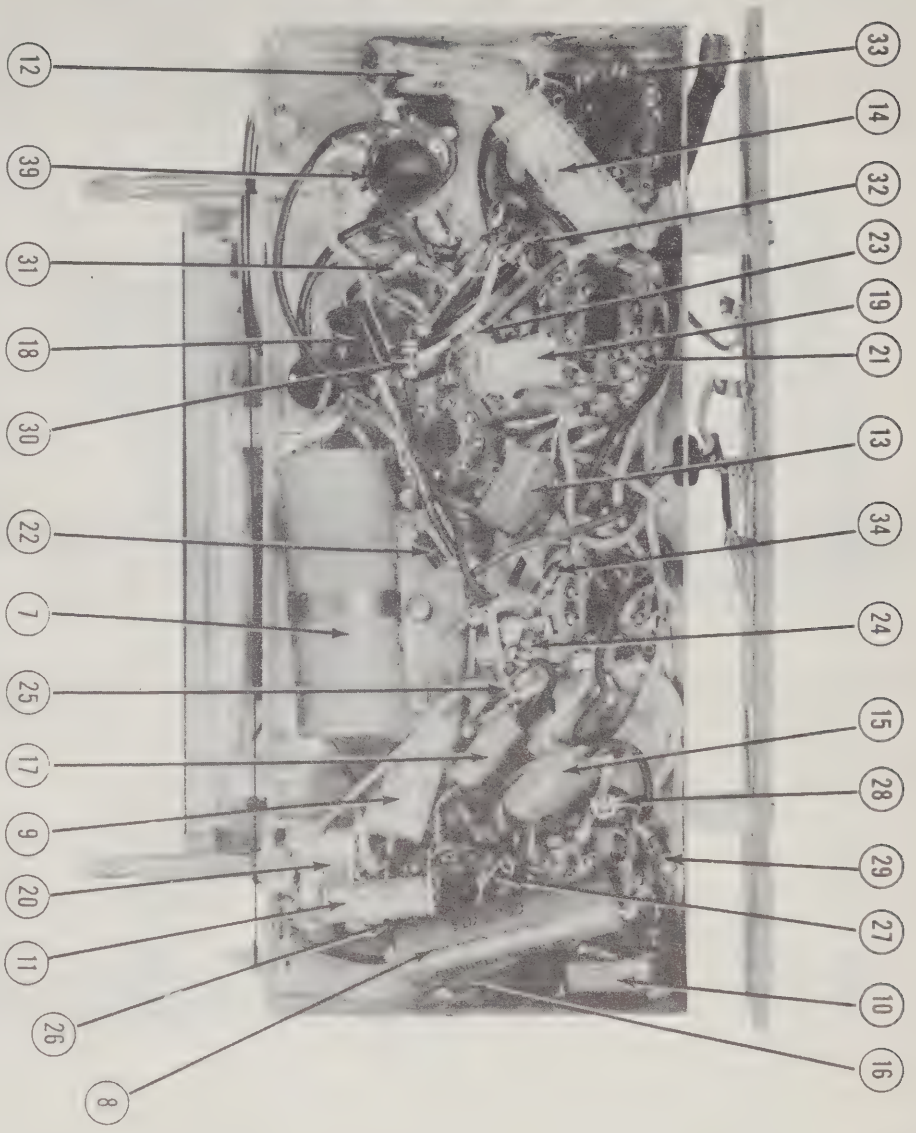
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRAV-LER PART No.		
42	Bayonet	6-8	0.15	Brown	PB-1		Type 47

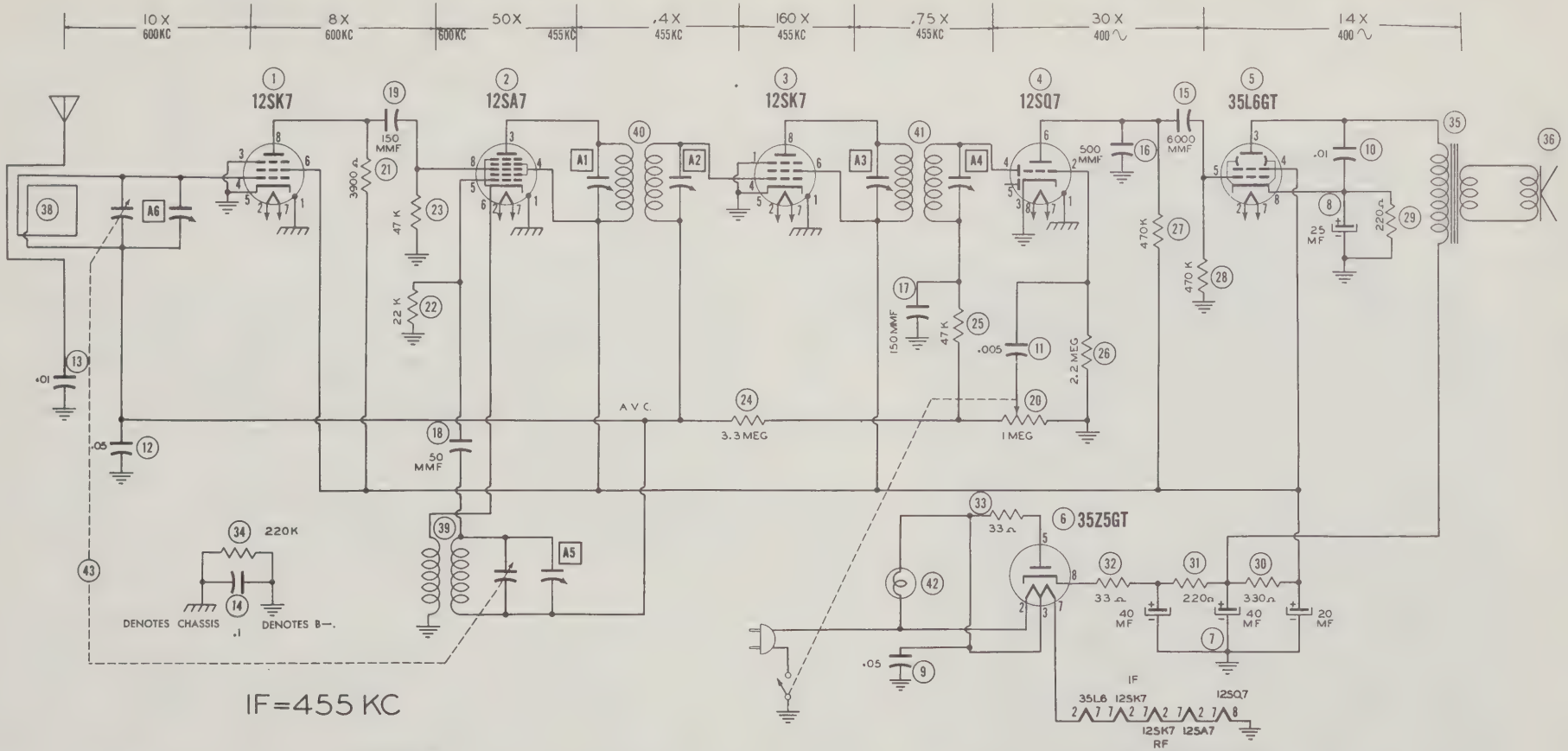
MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
43	2 Gang Var. Cap.	GC-5	(30-440MMF, 30-220MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7GT	0V.	24VAC	0V.	-.4VDC	0V.	85VDC	37VAC	47VDC
2	12SA7G	0V.	12VAC*	85VDC	85VDC	-7.2VDC§	0V.	24VAC	-.2VDC
3	12SK7GT	0V.	37VAC	0V.	-.4VDC	0V.	85VDC	50VAC	85VDC
4	12SQ7GT	0V.	-.6VDC	0V.	-.7VDC	-.8VDC	45VDC	12VAC	0V.
5	35L6GT	0V.	87VAC	92VDC	85VDC	0V.	0V.	50VAC	5.8VDC
6	35Z5	0V.	117VAC	112VAC	0V.	110VAC	0V.	87VAC	110VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7GT	220KΩ	24Ω	0Ω	4.3 Meg.	0Ω	50KΩ	36Ω	94KΩ
2	12SA7	220KΩ	12Ω	50KΩ	50KΩ	22KΩ	.8Ω	24Ω	47KΩ
3	12SK7GT	220KΩ	36Ω	0Ω	4.3 Meg.	0Ω	50KΩ	50Ω	50KΩ
4	12SQ7GT	220KΩ	2.2 Meg.	0Ω	1 Meg.	INF.	520KΩ	12Ω	0Ω
5	35L6GT	INF.	83Ω	5.5KΩ	50KΩ	470KΩ	0Ω	50Ω	250Ω
6	35Z5GT	INF.	110Ω	107Ω	INF.	14Ω	INF.	83Ω	50KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4812-24

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

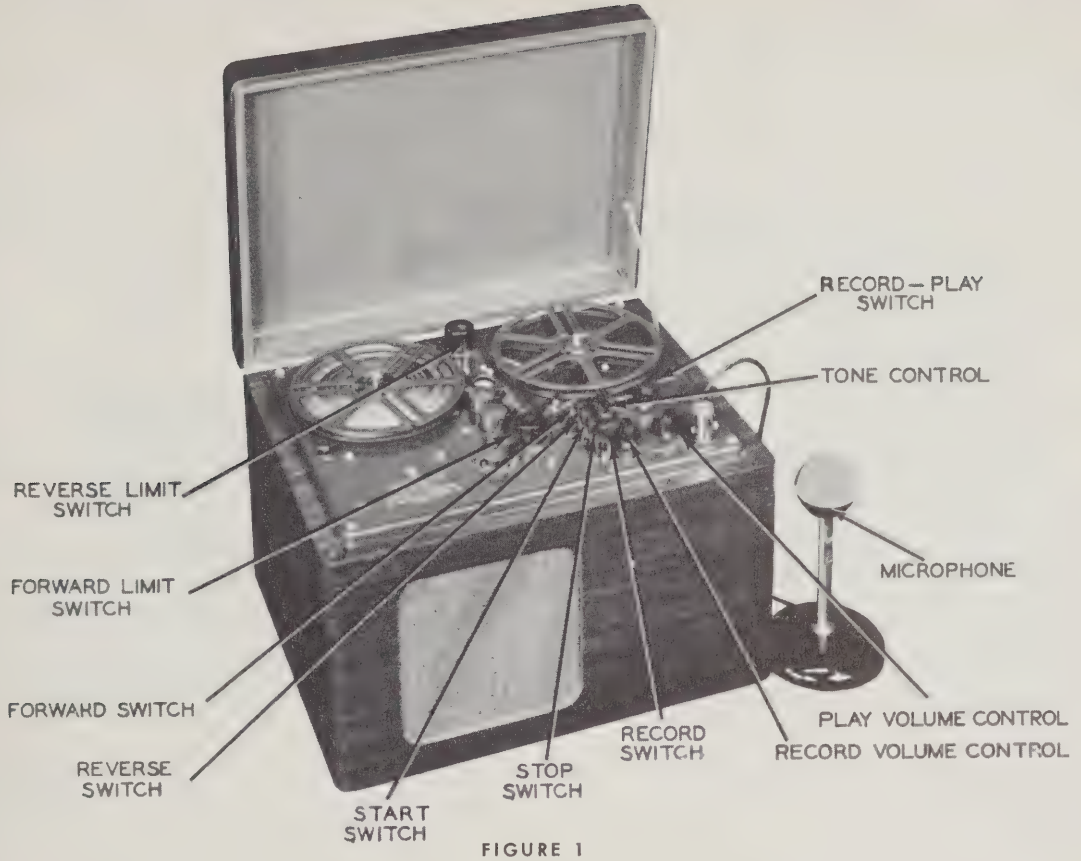

FIGURE 1

INTRODUCTION

1. Although at first glance the tape recorder may appear to be a complicated instrument, closer inspection will show that it is neither as complicated mechanically as an automatic record changer nor as complicated electrically as a superheterodyne receiver.

2. Fundamentally, the art of a magnetic recording is old, dating from the last century. A magnetic recording consists of a varying degree of magnetization of any convenient form of signal carrier which can be magnetized and maintain the magnetized state, as well as being mechanically stable. In the SOUNDMIRROR, this material is a strong paper tape or ribbon, .248 inches wide maximum, on which a magnetic coating has been applied.

3. This paper tape is moved at a fixed rate of speed through a magnetic field which acts on this coating to produce a record in the form of the different amounts of magnetization. In the playback process the tape is moved at the same rate of speed past a pickup coil; a voltage proportional to the magnetization is generated in the pickup coil and is amplified in a conventional amplifier so that it may be reproduced through a speaker.

4. Much as the grid bias is used in a vacuum tube, a bias current is mixed with the signal current when a recording is made. In the BK401, a 30 KC bias having an amplitude of approximately twice that of the peak amplitude of the signal current is used. It is very important that this bias be present, since its absence will cause a distorted recording which cannot be corrected.

5. A magnetic recording is unique in that the recording material is not physically or mechanically changed in the recording or playback processes. For this reason, the recording may be played back many times, or erased by a demagnetization process so that the tape may be used countless times for recordings. This erasing process is similar to the recording and consists of recording, with the bias only, at such a high level that all previous information on the tape is cancelled out and the average magnetic state of the tape is as it was before any recording was made on it. Anything which interferes with this high power bias will result in incomplete erasing.

6. The erase head is so placed on the recorder that the tape passes through it before the recording head. Erasure takes place automatically as recording occurs so that no special step is necessary. As will be noted in the operating instructions, the procedure for setting the unit for the erase-record processes is such that a recording will not be inadvertently erased.

7. As this unit employs motors and vacuum tubes, a considerable amount of heat is generated within the unit; therefore, in order to provide sufficient ventilation, the unit should be placed no closer than six inches from the nearest wall and should never be operated on top of a radiator or near a warm-air outlet.

Manufactured by THE BRUSH DEVELOPMENT COMPANY, 3405 Perkins Ave., Cleveland 14, Ohio

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BRUSH SOUNDMIRROR
MODEL BK401

BRUSH SOUNDMIRROR
MODEL BK401

OPERATING INSTRUCTIONS

1. The Brush BK401 SOUNDMIRROR is designed to operate from 105-120 volts, 60 cycle AC. If 50-cycle current is the only power available, the BK 401-1 should be used. The BK401-1 is designed for 50-cycle operation and makes recordings which may be interchanged with those of the BK401. Radio servicemen can supply a converter for operation from DC power, or a transformer for operation from line voltages other than 105-120 volts.

Do not connect the unit to a DC power source or to other supply voltages unless the unit is adapted as described above.

Recording

2. To prepare the SOUNDMIRROR for recording:
   (a) Insert the line cord plug into a convenient wall receptacle of the proper rating.
   (b) Turn the power switch (93) to the "ON" position.
   (c) Place a full reel of tape on the supply reel turntable (128) so that the tape will feed from the reel as indicated by the arrow on the panel.
   (d) Place an empty reel on the take-up reel turntable (137) and feed the end of the tape up through one of the radial slots in the reel. Hold the end of the tape and rotate the reel in a counterclockwise direction four or five revolutions. The tape should now be firmly fastened to the take-up reel. The black coating of the tape should face inward on the supply reel and outward on the take-up reel.
   (e) Hold the take-up reel and pull a sufficient amount of tape from the supply reel to go through the heads (98), around the capstan (144), and past the forward limit switch (96). Follow the arrows on the panel. The black coating of the tape should bear against the pole pieces of the two heads (98).
   (f) Turn the Record-Play switch (94) to the record position.
   (g) If a microphone recording is to be made, connect the Brush model BA-106 crystal microphone which is supplied with the unit, to the microphone jack (138).
   (h) If a recording from a radio receiver is desired, it is recommended that the detector circuit of the radio be connected to the radio input terminals on the back of the SOUNDMIRROR. It is possible to make this connection across the radio speaker voice coil, but this will reflect any audio circuit deficiencies present in the radio.
   (i) Depress the Record pushbutton (97E) and adjust the signal level, by means of the Record Volume Control (41), until the indicating tube (4) almost closes on peak passages.
   (j) Depress both the Record (97E) and the Forward (97A) pushbuttons so that both lock in the depressed position.
   (k) Momentarily depress the Start pushbutton (97C) to start the drive mechanism and begin the recording.
   (l) The Stop pushbutton (97D) is used to stop the recording process.

To Rewind

3. (a) Fasten the tape to the supply reel (101) by feeding the end of the tape up through one of the radial slots in the reel and holding the end while rotating the reel for four or five revolutions in a counterclockwise direction. The tape should now be firmly fastened to the supply reel, and the black-coated surface should be toward the center of the supply reel.
   (b) Place the tape in the slot of the Reverse Limit switch (95). This switch controls the dynamic braking applied upon completion of the rewinding or if the tape should break.
   (c) Depress the Reverse pushbutton (97B). The tape will now completely rewind and automatically stop when the rewinding is complete. If desired, the operator may stop at any point by depressing the Stop pushbutton (97D).
   Never attempt to stop fast-moving reels by hand.

To Play a Recording

4. (a) Insert the line cord plug into a convenient wall receptacle of the proper rating.
   (b) Turn the power switch (93) to the "ON" position.
   (c) Place the reel containing the desired recording on the supply reel, or left hand, turntable so that the tape will feed from the reel as indicated by the arrow on the panel.
   (d) Place an empty reel on the take-up reel, or right hand, turntable and feed the end of the tape up through one of the radial slots in the take-up reel. Hold the end of the tape and rotate the take-up reel in a counterclockwise direction four or five revolutions. The tape should now be firmly fastened to the take-up reel. The black coating should face inward on the supply reel and outward on the take-up reel.
   (e) Hold the take-up reel and pull a sufficient amount of tape from the supply reel to go through the heads (98), around the capstan (144), and past the Forward switch (96). Follow the arrows on the panel. The black coating of the tape should bear against the pole pieces of the two heads (98).
   (f) Turn the Record-Play switch (94) to the "Play" position.
   (g) Depress the Forward pushbutton (97A).
   (h) Momentarily depress the Start pushbutton (97C) to start the drive mechanism.
   (i) Adjust the volume by means of the Play Volume control (40), and the tone by the tone control (42).
   (j) The Stop pushbutton (97D) is used to stop the SOUNDMIRROR when playing a record; however, the unit will automatically stop upon completion of a record or in case the tape should break.

To Start Playback at Advanced Position

5. If it is desired to begin to play a recording at an advanced position on the reel, or to skip a portion of a reel, it may be done by allowing the tape to wind directly from the supply reel to the take-up reel. When the heads and capstan are thus bypassed, the tape will wind at a high rate of speed. The Forward pushbutton (97A) is depressed and the Start pushbutton (97C) held down until the approximate position is reached. Braking is provided by pushing the Reverse pushbutton (97B). After the reels have come to a stop, the Stop pushbutton (97D) should be pressed to relieve the brake. Never attempt to stop fast-moving reels by hand.

It is suggested that colored Scotch tape be used to mark the tape to show the desired divisions or passages.

To Repair or Splice Tape

6. In case the tape is broken accidentally, or it is desired to edit the recording, a splice may be made with Scotch tape. Do not use medical adhesive tape as the adhesive material is not suited for this purpose. The Scotch tape should be applied to the reverse, or uncoated, side of the recording tape. The edges of the splice should be trimmed with a small pair of scissors, or a knife, to bring the width of the splice to that of the rest of the recording tape so it will pass through the heads without interference.

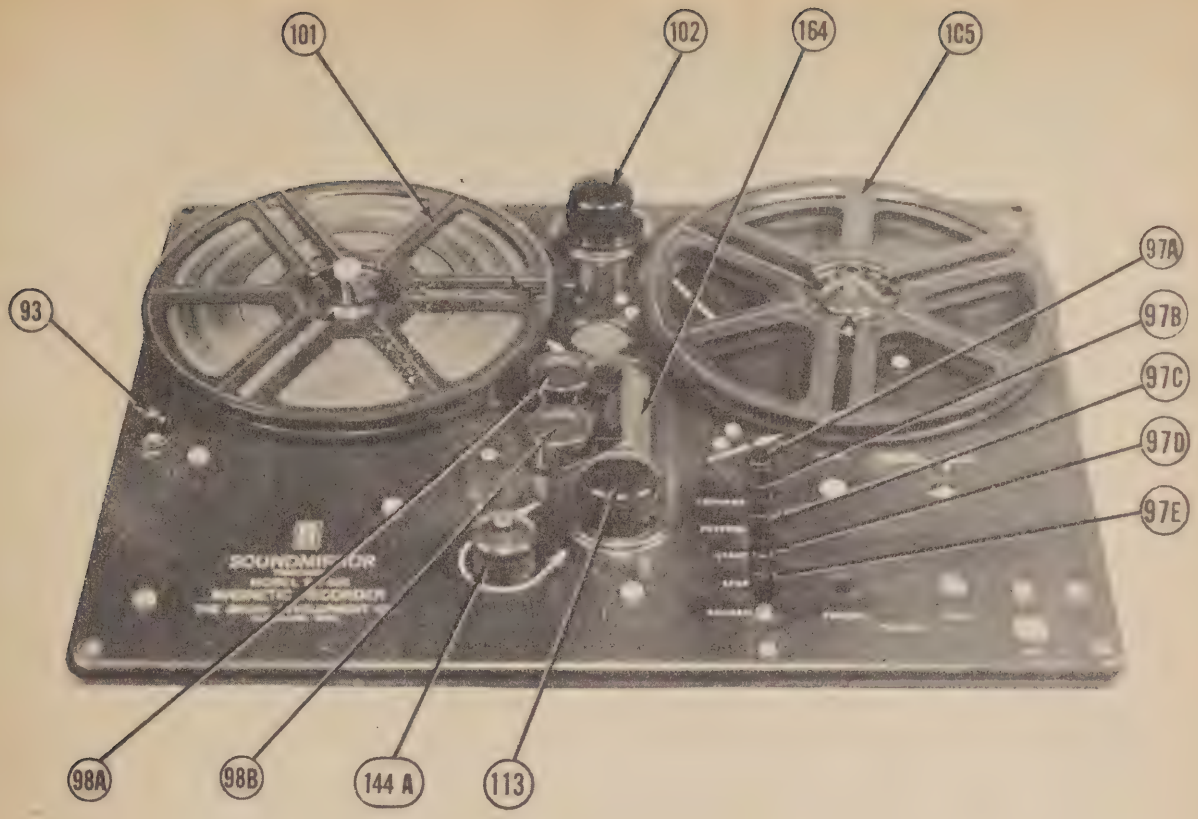


FIGURE 2—PANEL TOP VIEW WITH AMPLIFIER UNIT REMOVED

MECHANICAL OPERATION AND ADJUSTMENT

1. The function of the mechanical section of the SOUNDMIRROR is to deliver the tape at a uniform rate of speed past the erase and record-reproduce heads. It also provides reels for convenient handling of the lengthy tape and a means of rewinding the tape. In order to insure that the proper rate of speed be maintained, it may be necessary to make some of the adjustments outlined in the following.

Supply Reel Brake

2. This brake applies friction to the supply turntable so that, during recording or playback, a tension is maintained on the tape between the supply reel and the heads. The tension is necessary to prevent the tape from being supplied faster than it passes through the heads. If it is insufficient, the tape will spill and tangle; if it is excessive, the rate of speed of the tape will be too slow and uneven. The brake pressure is adjusted by bending the body of the spring brake (126). The force necessary to rotate the supply reel should be from .75 to 1.0 inch-ounces. It may be measured by winding from ten to twelve turns of a short length of tape around an empty reel. Place the reel on the supply shaft and use a small scale (spring balance) fastened to the end of the tape to measure the force.

3. If the felt pads become loosened from the metal, it will be necessary to replace the entire brake assembly. These pads are secured with a special cement and are not replaceable in the field.

Limit Switches

4. The purpose of the Forward Limit switch (96) is to automatically bring the unit to a stop upon the completion of a reel, or accidental breaking of the tape, when recording or playing a record. The Reverse Limit switch (95) serves to automatically halt the unit when a reel has finished rewinding or if the tape should accidentally break during rewinding. Failure of the Limit switches to function properly will result in tape spillage and may interfere with the tape travel. If either Limit switch is loosened or removed, it will be necessary to check and readjust it when remounting.

5. Fig. 4 shows the proper adjustment of either Limit switch with the small roller spring removed. Note that the main reed is not straight, but angles slightly from the body of the switch. The contacts should be barely touching, as shown, and will be held open when the roller spring is in place. The Forward Limit switch should act when the reed is ⅛" from the end of its travel in either opening or closing directions. The Reverse Limit switch should be adjusted to act as the point shown in Fig. 6. A maximum pressure of 14 grams (approximately ½ ounce) should be required to bring the switch over its null point, and a minimum of 4 grams (approximately 1/7 ounce) to hold, as measured at point where the actuator contacts the reed. Adjustment of either Limit switch is accomplished by loosening the screws which hold the switch to the panel and repositioning on the panel. All adjustments should be made when the switches are cool to minimize temperature effects. If the roller spring is removed, it should be replaced in exactly the same position as it was, on the mounting bracket side of the switch and with the convex side of the spring away from the reed and toward the mounting bracket. The amount of overtravel should be checked to see that it is not great enough to reopen the switch contacts.

6. The Limit switch actuators should be carefully adjusted so that the tape rides on the Limit switch cover when in motion. The tape should carry the actuator until, at the end of the actuator travel, the actuator is inside the cover and prevented from coming out by the tape. In some cases, it may

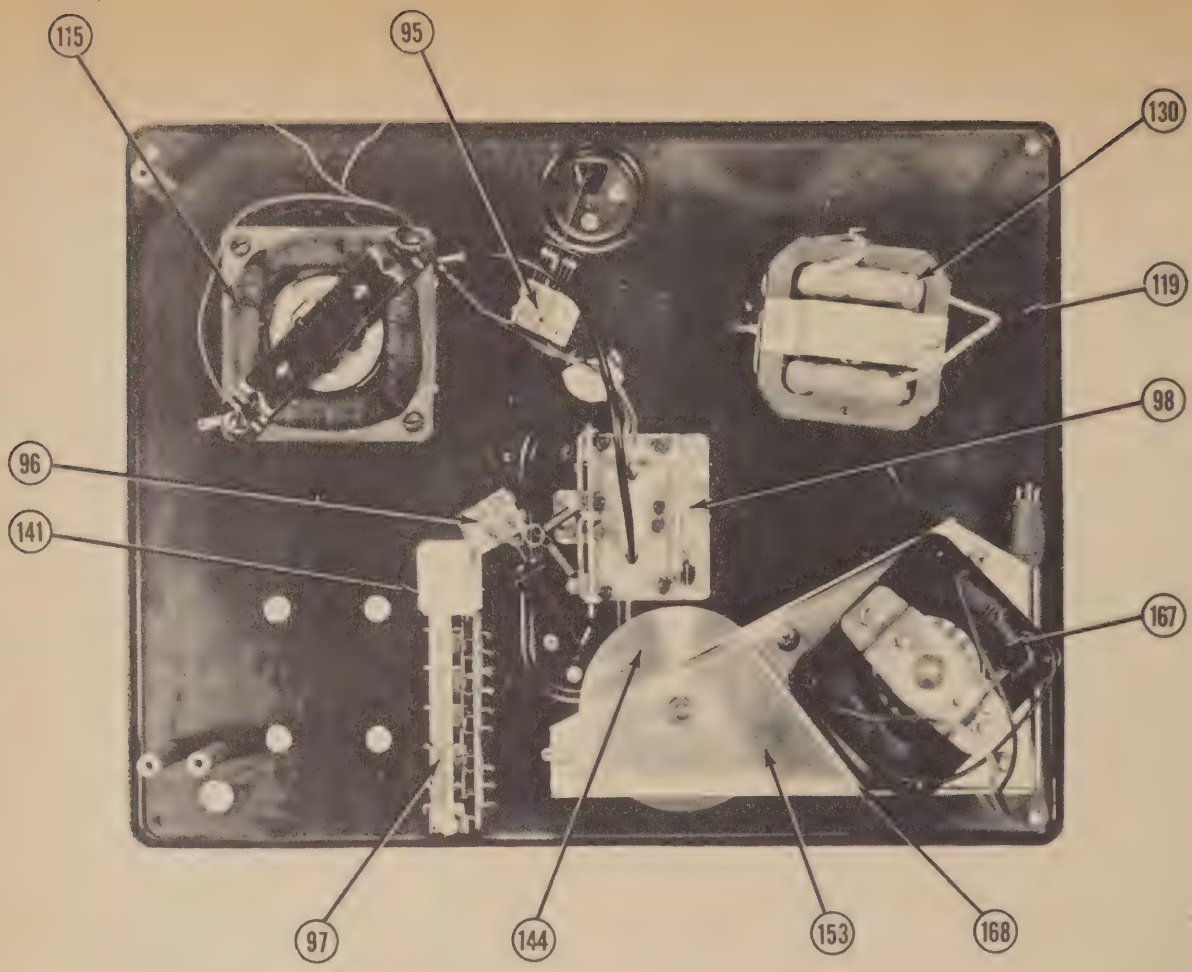


FIGURE 3—PANEL BOTTOM VIEW WITH AMPLIFIER UNIT REMOVED

be necessary to clear the paint from the actuator pivot holes to allow the actuator to move freely. If the Forward switch actuator is not properly adjusted, it may cause flutter and distortion. This is caused as the actuator chatters and repeatedly pushes against the tape, causing speed variation. In extreme cases the switch may chatter enough to interrupt the motor circuits. Proper adjustment of the actuator is such that it contacts the tape at enough of an angle to insure rapid and sure action. If the actuator meets the tape at an angle too near 90°, it may cause chatter.

7. If the tape does not freely enter the Reverse Limit switch guide, when rewinding, it may be necessary to remove burrs from the edge of the guide. The Limit switch covers are not interchangeable and if the covers are removed, they should be replaced in their proper position. If the Forward cover is used in the reverse position, the tape will not enter the reverse guide.

Head Brakes

8. The erase and record-reproduce head brakes (133, 134) have a two-fold purpose. They keep the tape in proper contact with the heads and also keep a constant pressure against the tape to aid in maintaining the constant rate of tape travel. If the head brake pressure is insufficient, poor recording or playback will result because the tape will not be in proper contact with the head pole pieces. The speed of the tape will be uneven and too rapid. If the pressure is excessive, the tape speed will be slow and uneven. The head brake adjustment is illustrated in Fig. 5. The total pressure is adjusted by bending the actuating lug which extends from the bell crank assembly (141) and receives the pressure from the staff of the Forward pushbutton. Bending the lug away from the pushbutton staff decreases the pressure, and toward it increases the pressure. It is important to note that this regulates the *total* pressure applied to both heads. The portion of this total that is applied to either head is adjusted by carefully bending the bell crank arm. Bending the bell crank arm toward the erase head increases the erase head brake pressure and vice versa. The proper adjustment is such that each head brake receives exactly one-half of the total pressure. If additional adjustment is necessary, it may be obtained by bending the lower arm of either head brake toward or away from the bell crank. Bending it away from the bell crank will increase pressure. The total head brake pressure should be from 1.5 to 2.0 ounces and may be measured with a small scale (spring balance) fastened to the end of a short section of tape pulled through the heads.

9. If the felt brake pad of either head brake becomes loose, it will be necessary to replace the complete brake shoe assembly (133 or 134). The felt pads are fastened with a special cement and are not replaceable in the field.

10. The most common cause of the head brakes failing to retract when the stop pushbutton (97D) is depressed, is interference with the underpanel wiring. This is easily corrected by rearrangement of the wiring. This same condition may not allow the brakes to properly contact the heads. Other causes of poor head brake operation are: Interference with the edge of the panel, which is corrected by repositioning the head assembly (98); interference with the head cover (98A or 98B), which is corrected by changing the angle of the shoe; and binding at the pivot, which is remedied by adjusting the end play in the bracket. If the angle of the shoe is to be changed, the brake assembly must be removed from the bracket before bending. After bending and replacing, the assembly must be adjusted for proper pressure. The end play in the bracket is controlled by the end play washer (127A) which may be removed or replaced with a washer of different thickness if necessary.

Drive Assembly

11. The drive assembly is illustrated in Fig. 7. The proper operation of this mechanism is extremely important to satis-

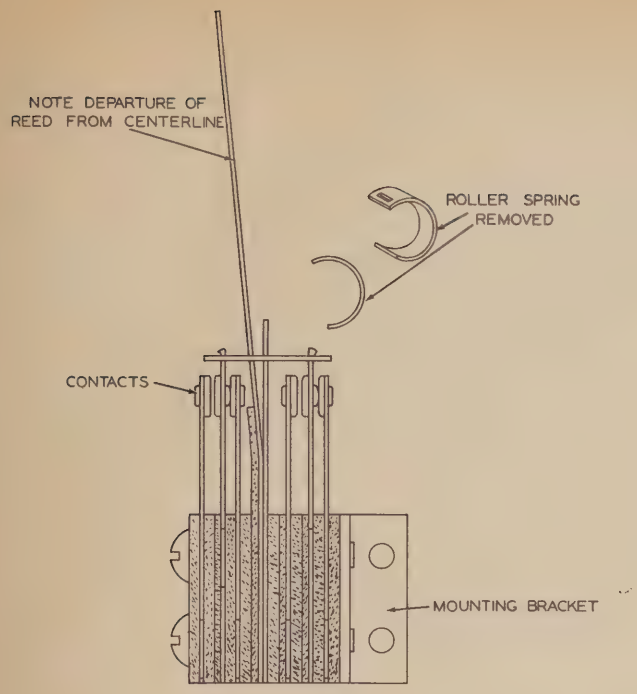


FIGURE 4—LIMIT SWITCH

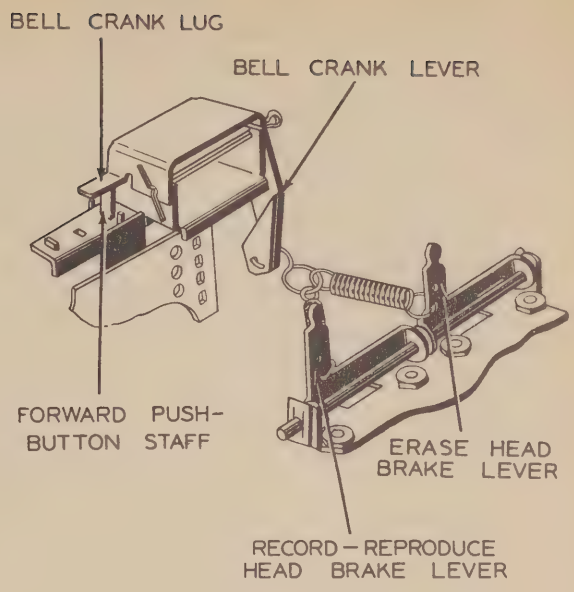


FIGURE 5—HEAD BRAKE

factory operation of the SOUNDMIRROR. The serviceman is advised not to attempt any major repair of this assembly, but to replace it as a unit. This is because of the many points in the assembly which might cause speed variation in the SOUNDMIRROR and result in distortion. Correct tape speed is 7.5 inches ± 2% per second.

12. The bearing felts of the drive motor (167) should be lubricated with light oil. The idler wheel (147) bearing should be lubricated sparingly with Lubriplate No. 105, as should the interface of the idler wheel bracket (155) and the drive assembly plate (153). A small amount of the Lubriplate should be used under the idler wheel adjustment washer (146). The upper surface of the capstan felt washer (156) should be coated with Beacon No. 285 grease. Extreme care should be taken to prevent oil or grease from contacting any of the drive surfaces, which include the drive motor (167) shaft, sometimes covered with a drive spring (161); the rubber tire of the idler wheel; the outer circumference of the capstan flywheel (144); and the Corprene surface (144A) of the capstan. These surfaces should not be touched after cleaning to prevent finger printing. Carbon tetrachloride is recommended as a cleaning solvent. The Corprene surface of the capstan is best cleaned when it is in motion without tape. This may be done by depressing the forward and start pushbuttons at the same time and allowing the capstan to rotate as the cleaning cloth is applied. In extreme cases, crocus cloth may be used to smooth the surface.

13. The idler wheel tension adjustment nut (158) should be adjusted so that there is barely perceptible friction between the idler wheel mounting bracket (155) and the drive assembly plate (153). The idler wheel tension adjustment spring position is critical since misplacement will cause it to interfere with the idler wheel. When replacing this spring, it should be connected to the hook on the idler wheel mounting bracket (155) first and given one turn clockwise before connecting to the lug (157A). The tension on the idler wheel should be 3 ounces.

14. If the SOUNDMIRROR has been out of operation for some time, the rubber tire of the idler wheel (147) may acquire a permanent set, or flat spot, at the point of contact with the drive motor and capstan. This condition may usually be relieved by running the unit for one-half hour or more. If this is not effective, the idler wheel should be replaced.

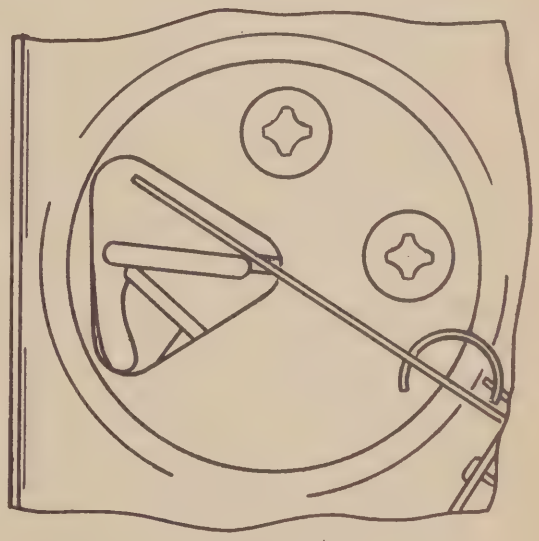


FIGURE 6—REVERSE LIMIT SWITCH

15. In removing the drive assembly for servicing or replacement, it will be found that it is more convenient to remove the plate mounting screws (160) on the underside of the assembly than it is to remove those holding it to the main panel.

Pushbutton Assembly

16. A standard latching type five-station pushbutton switch (97) is used. Care must be taken to see that the connecting leads do not place the terminal strip of the switch in a strain because this will cause poor contact and may even allow a contact to drop from the switch. All stations except the Start (97C) latch when depressed. If they fail to do so, it may be necessary to file the latching cam of the offending station so that it will engage the latching bar. If the switch is in poor condition, it should be replaced as a unit.

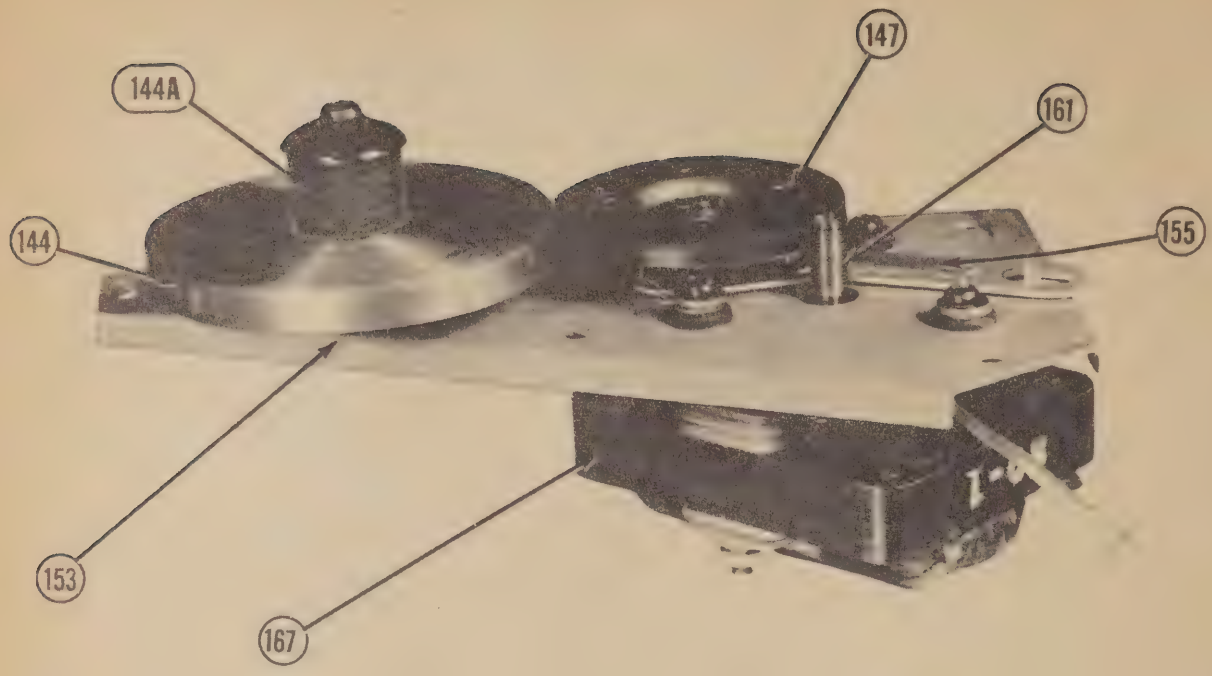


FIGURE 7—DRIVE ASSEMBLY UNIT

MOTORS

1. The BK401 SOUNDMIRROR employs three electric motors. One is used as a take-up motor (115); one as a rewind motor (130); and one as a drive motor (167). Three different types of motors are to be found in the units. Some units may have all of one type; two of one type, and one of another; or, as shown in the exploded view on pages 10 and 11, one each of the three different types. Although nominally the same, each motor has been selected for its position in the machine because of its individual characteristics. For this reason, the motors must not be interchanged between positions. When ordering replacement motors give the part number of the motor as identified from the exploded view (Fig. 12) as well as the position of the motor in the machine. The motor shown in the exploded view as a take-up motor (115), is a part No. 300345; the one shown as a rewind motor (130) is a part No. 204927; and the one shown as a drive motor (167) is a part No. 201404. Remember that they may appear in different positions in other units.

2. The bearing felts of each motor should be lubricated with light oil, being careful not to get oil on the drive or brake surfaces of the unit. In some cases the motor bearings become misaligned in shipping or due to rough handling. They may usually be realigned by grasping the motor shaft and turning it while pulling upward. In extreme cases, it may be necessary to run the motor without a load for five or six hours to free up the bearings.

3. If a motor is found whose shaft has become bent because of rough handling, it is recommended that the entire motor be replaced. This condition usually causes the rotor to drag on the stator and will cause speed variation.

4. Some drive motors (167) have a drive spring (161) on their shaft. This spring should not be removed since it is not readily replaceable and is supplied when necessary as an integral part of the motor. Some drive motors require a hum shield (168). When replacing these motors be sure that the shield does not touch the motor laminations, and position the shield for lowest hum level in the amplifier. It may be found that the take-up motor touches the pre-amplifier chassis and causes severe hum. In this case the offending corner of the motor frame or oil retainer bar should be cut or filed to clear.

5. Misadjustment of the unit's several friction brakes, accumulation of dirt or tape coating on the capstan or limit switch, or oil or grease on the drive surfaces will all tend to make the operator think that he has one or more weak or defective motors. All these points should be checked before passing judgment on a motor.

6. Since the take-up motor (115) runs at greatly reduced speed during the recording and playback processes, it is normal that this motor become very warm. It is of a type designed to operate at high

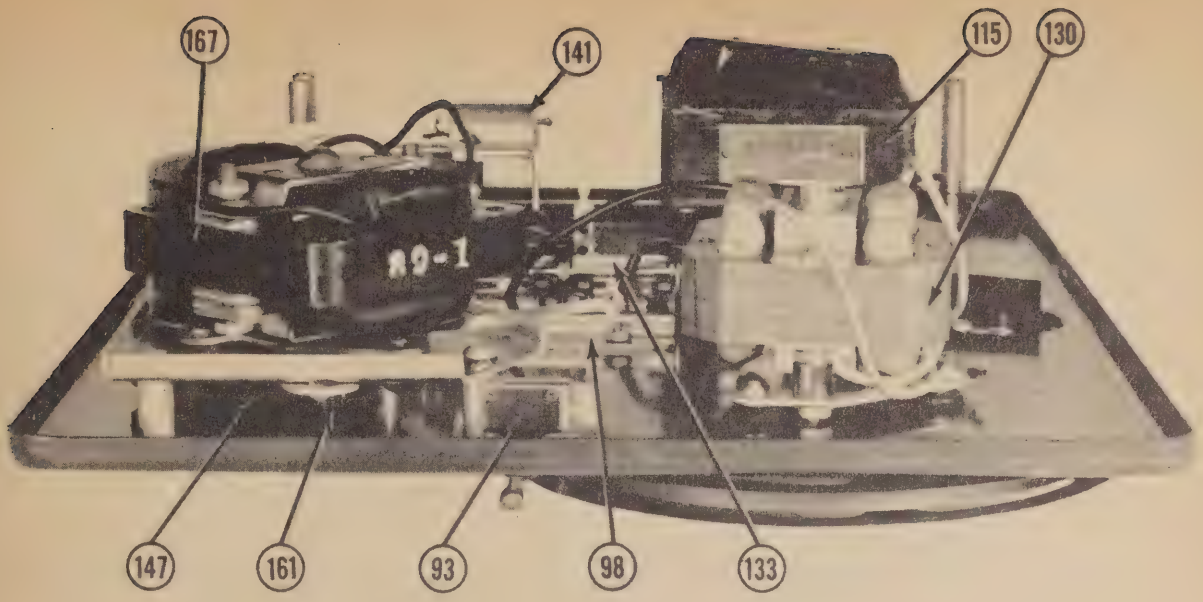


FIGURE 8—BOTTOM VIEW FROM LEFT SIDE AMPLIFIER UNIT REMOVAL

temperatures and will suffer no ill effects. The take-up reel (105) is mounted directly on the shaft of the take-up motor and will become quite warm for that reason during extended operation of the SOUNDMIRROR. This will in no way injure the tape or the reel.

7. Distortion may be caused by irregular torque of the take-up motor (115). This effect is generally caused by insufficient skew in the rotor laminations and appears only at the low speed at which this motor operates during the recording and playback processes. It may be detected by grasping the motor shaft, turning the motor on by depressing both the forward (97A) and start (97C) pushbuttons, and feeling the force needed to slowly turn the motor against its torque. This necessary force should be smooth and regular. If a "cogging" effect, or regular variation in force, is noted, the motor must be replaced.

8. Each motor is cushion mounted by means of rubber grommets and care should be taken to see that the screws which hold the motor laminations together do not touch the panel above the motor, since this will cause hum.

9. The exploded view shows one type of turntable, reel clamp or cap, and holddown screw on the supply position and another on the take-up. These differences are due to the individual type of motor and not to the position in the unit. Should the same type motor be used in both locations, for example, the associated reel handling equipment would be the same.

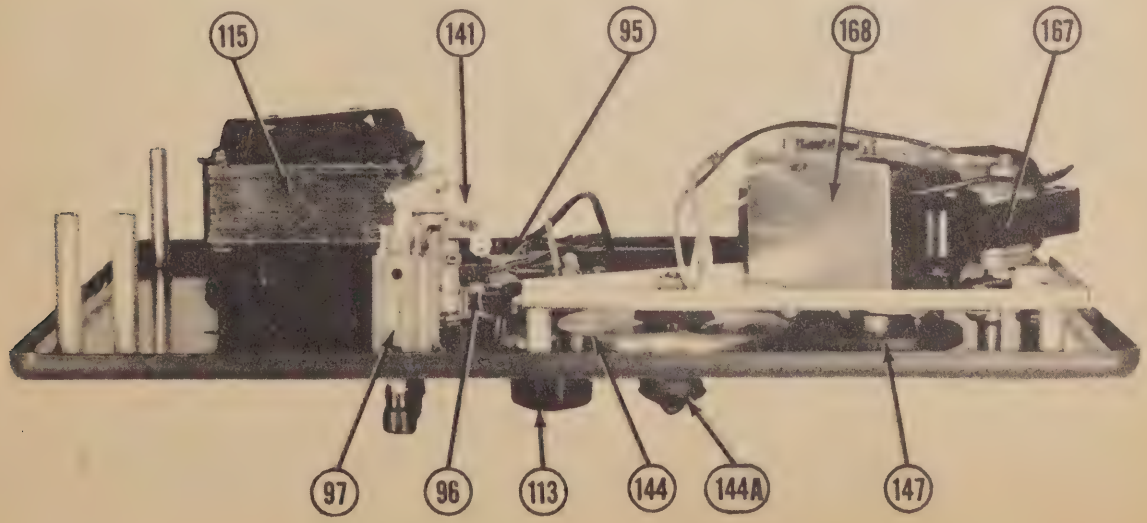


FIGURE 9—BOTTOM VIEW FROM FRONT AMPLIFIER UNIT REMOVAL

ELECTRONIC SYSTEM

In order to simplify the explanation of the electronic portions of the SOUNDMIRROR, the schematic diagram in Figure 13 has been sectionalized with broken lines. The letters designating these sections correspond to those on the block diagram shown in Figure 10 and to the following paragraphs.

Section A—Input Amplifier

This section uses the 6SJ7 tube (1) as a high-gain amplifier stage having a grid-to-plate gain in excess of 100 times. The microphone jack (138) disconnects the radio input circuit when the microphone plug is inserted. When recording, this stage amplifies the signal from microphone or radio inputs, and when playing back it amplifies the signal from the play head.

It is possible that the high-gain of this stage may cause it to rectify a signal from a near-by powerful broadcast station, mixing it with the desired audio signal. If this condition should exist, it may be corrected by connecting a 500 mmf. mica capacitor between the grid and the cathode terminals on the 6SJ7 (1). This connection must be made directly at the tube socket terminals. Also, connect a 500 mmf. mica capacitor between the cathode terminal of the 6SJ7 and the chassis ground. This connection should be made as close as possible to the tube socket terminal.

Section B—Play Amplifier

Half of the 6SN7 tube (2) is used as the second stage amplifier and feeds the phase inverter (Section J). When recording, this stage serves as a monitor amplifier. When playing back, it amplifies the signal from the recording medium. This stage includes the play volume control (40) and the frequency compensating circuits for play back

Section C—First Record Amplifier

The remaining triode of the 6SN7 tube (2) is the second stage amplifier which feeds Section E. This stage includes the record volume control (41), as well as the frequency compensating circuits, for use in the recording action.

Section E—Second Record Amplifier

This is the final stage used during recording and employs a 6SJ7 tube (3). During recording, it supplies the audio signal to the record-reproduce head through the audio coupling capacitor (25). The 30KC bias current is introduced in this stage. It is impressed across the plate circuit of the 6SJ7 through the coupling capacitor (22), and results in a current through the recording head coil, which is a mixture (not a modulation) of the 30KC bias current and the audio frequency which is being recorded.

The 30KC potential across the recording head

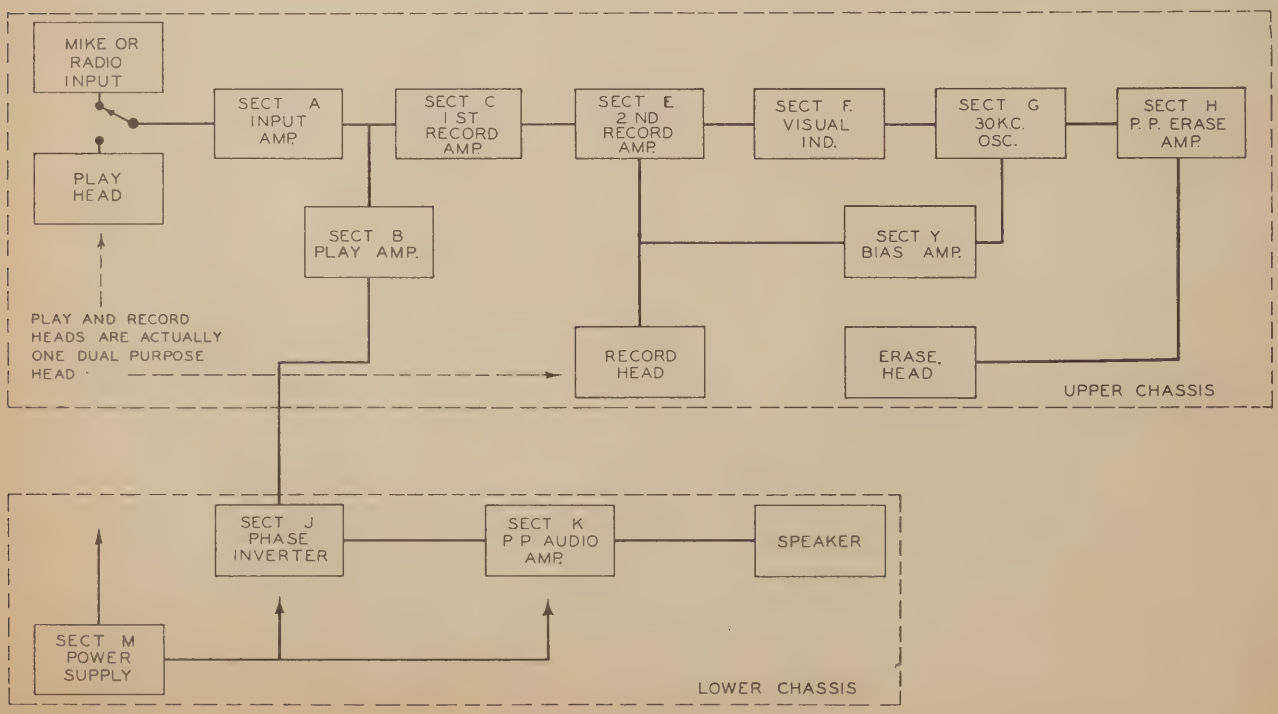

MIKE OR RADIO INPUT
PLAY HEAD
SECT A INPUT AMP.
SECT C 1 ST RECORD AMP.
SECT E 2 ND RECORD AMP.
SECT F. VISUAL IND.
SECT G 30KC. OSC.
SECT H P. P. ERASE AMP.
SECT B PLAY AMP.
SECT Y BIAS AMP.
PLAY AND RECORD HEADS ARE ACTUALLY ONE DUAL PURPOSE HEAD
RECORD HEAD
ERASE HEAD
UPPER CHASSIS
SECT J PHASE INVERTER
SECT K P P AUDIO AMP.
SPEAKER
SECT M POWER SUPPLY
LOWER CHASSIS

FIGURE 10—BLOCK DIAGRAM ELECTRICAL SYSTEM

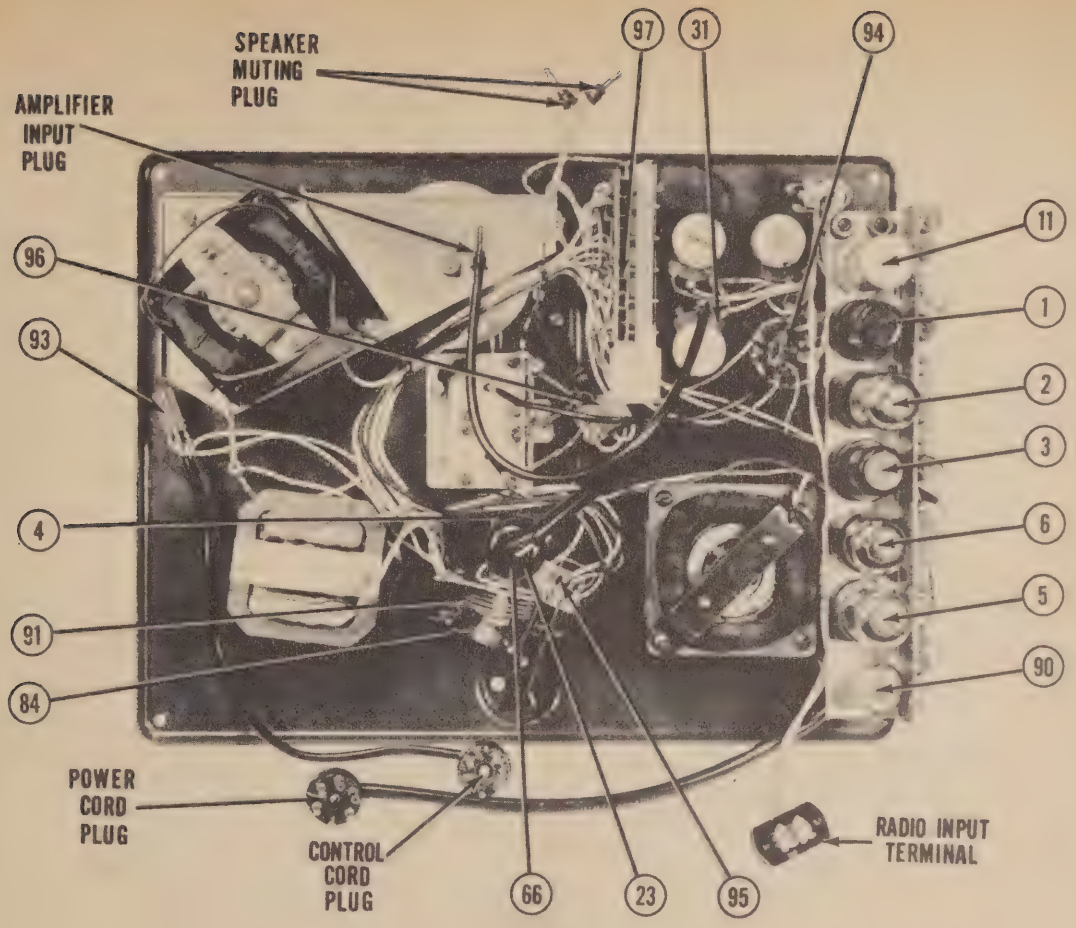


FIGURE 11—PANEL BOTTOM VIEW

should range from 60 to 100 volts, as measured with an AC vacuum-tube voltmeter having a minimum input impedance of 10 megohms.

Section F—Visual Recording Indicator

A type 6E5 tube (4) is used as the volume indicator when recording. It receives an audio voltage from the screen of the 6SJ7 second record amplifier tube (3). The screen of the tube is used as the source for this indicating voltage so that the audio voltage present will be the only actuator of the volume indicator. Since the 30KC bias current is available in the plate circuit, the plate could not be used as a source of audio voltage alone for the indicator.

Section G—30KC Oscillator

The first half of the 6SN7 (5) is used as the oscillator tube. The quality of this tube is critical and only one with a very high reading on a mutual conductance type tube tester should be employed. It may be necessary to interchange this tube with others of the same type to obtain best results. The bias current originated in this oscillator stage is, after proper amplification, used for the erasure as well as the recording bias.

Section H—Push-Pull Erase Amplifier

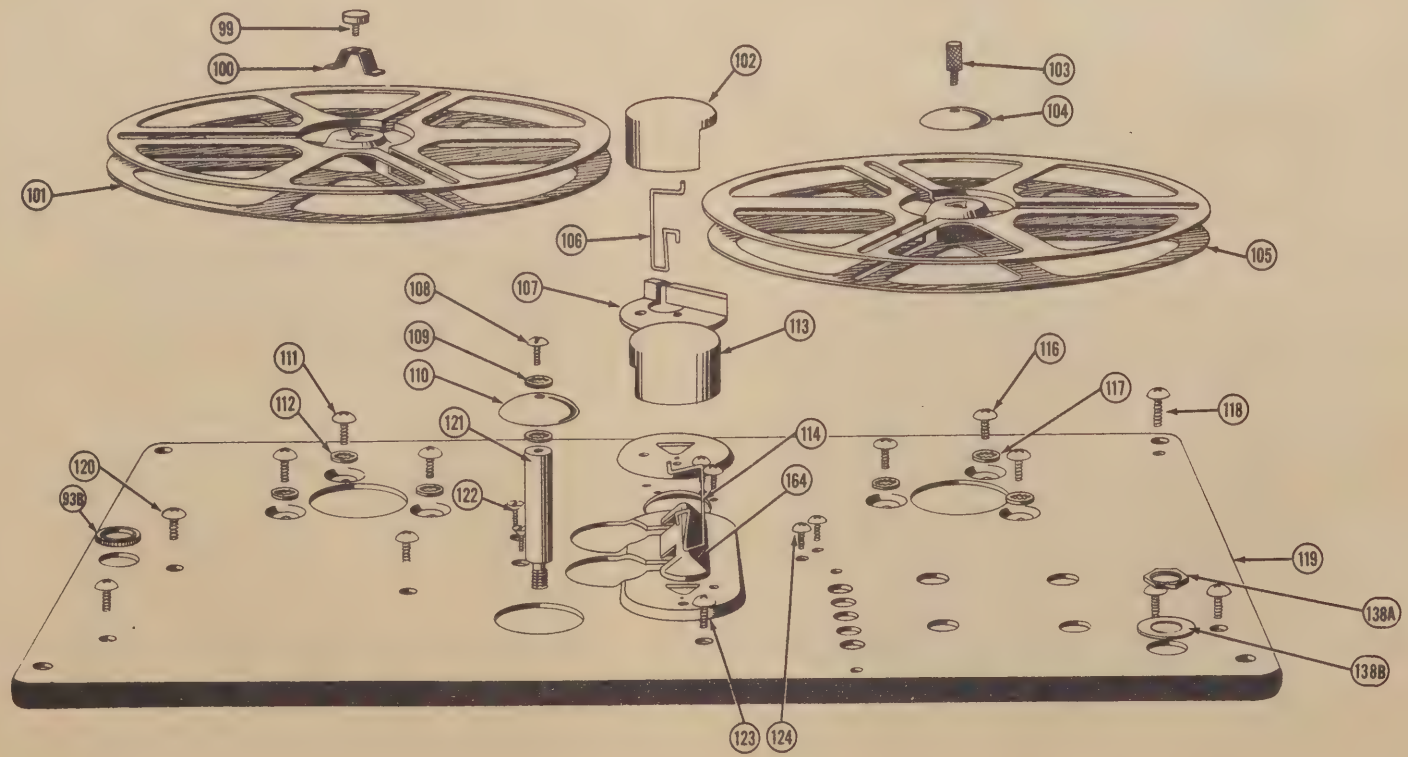
The two triodes of the type 6SN7 tube (6) are connected to form a push-pull amplifier which receives its driving signal from Section G. During the recording operation, the plate-to-plate potential in this stage ranges between 80 and 100 volts and results in a 30KC current through the erase head coil of approximately 20 ma.

Section J—Phase Inverter

This section is a conventional phase inverter stage and supplies the signal for the final amplifier stage. Either a 6SL7 or a 6SN7 may have been used in the phase inverter position (7). When a 6SN7 is employed, the grid resistor (80) should be 22K ohms, while this same resistor should have a value of 33K ohms when the 6SL7 is employed. It may be desirable in equipment using the 6SL7 to replace it with a 6SN7 with the proper grid resistor value, since this substitution may reduce possible microphonics.

Section K—Push-Pull Audio Amplifier

A type 6SN7 tube (8) is used in a conventional Class "A" push-pull audio amplifier output stage.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138A
138B
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A PHOTOFACT "EXPLODED" VIEW
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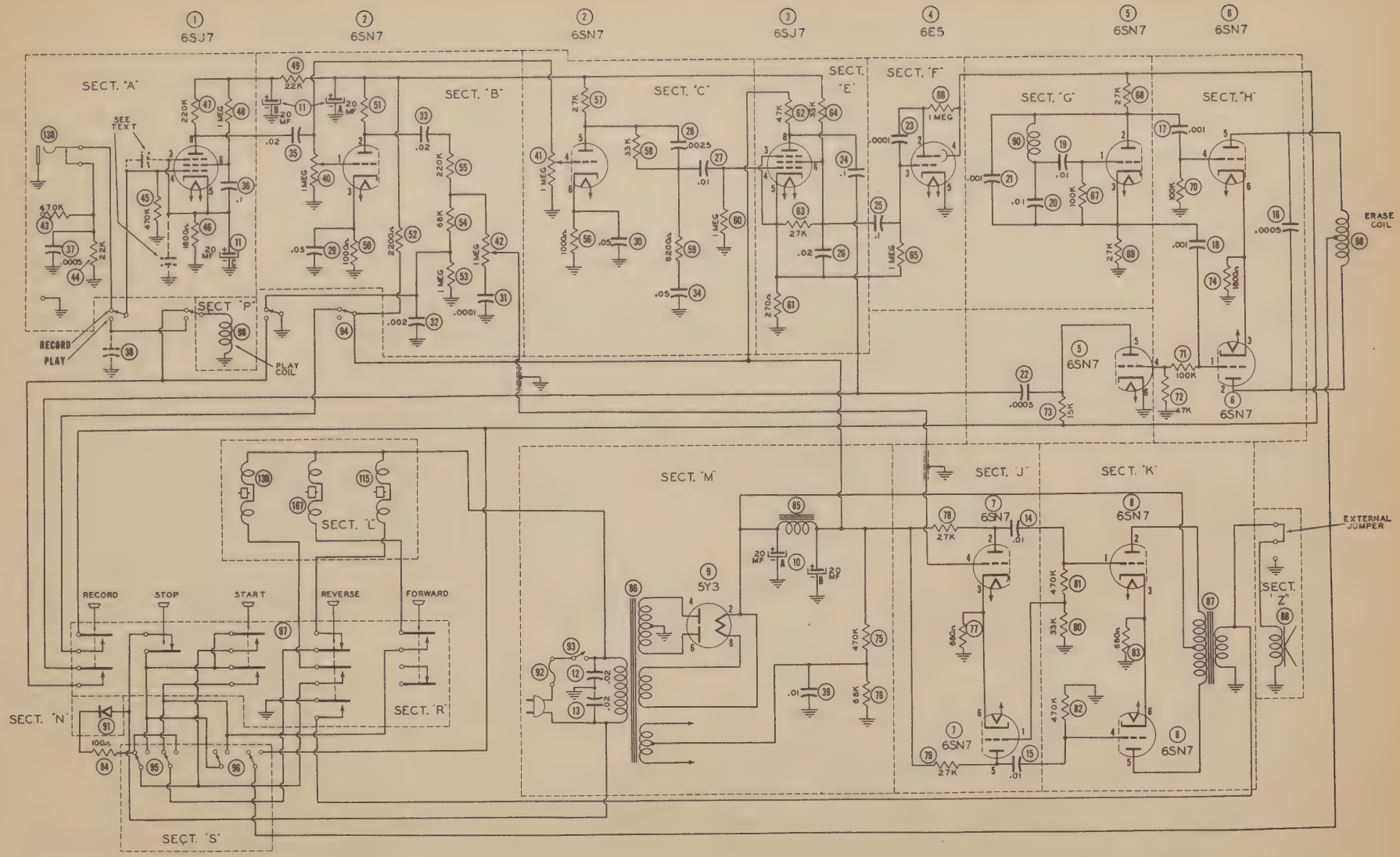

FIGURE 13

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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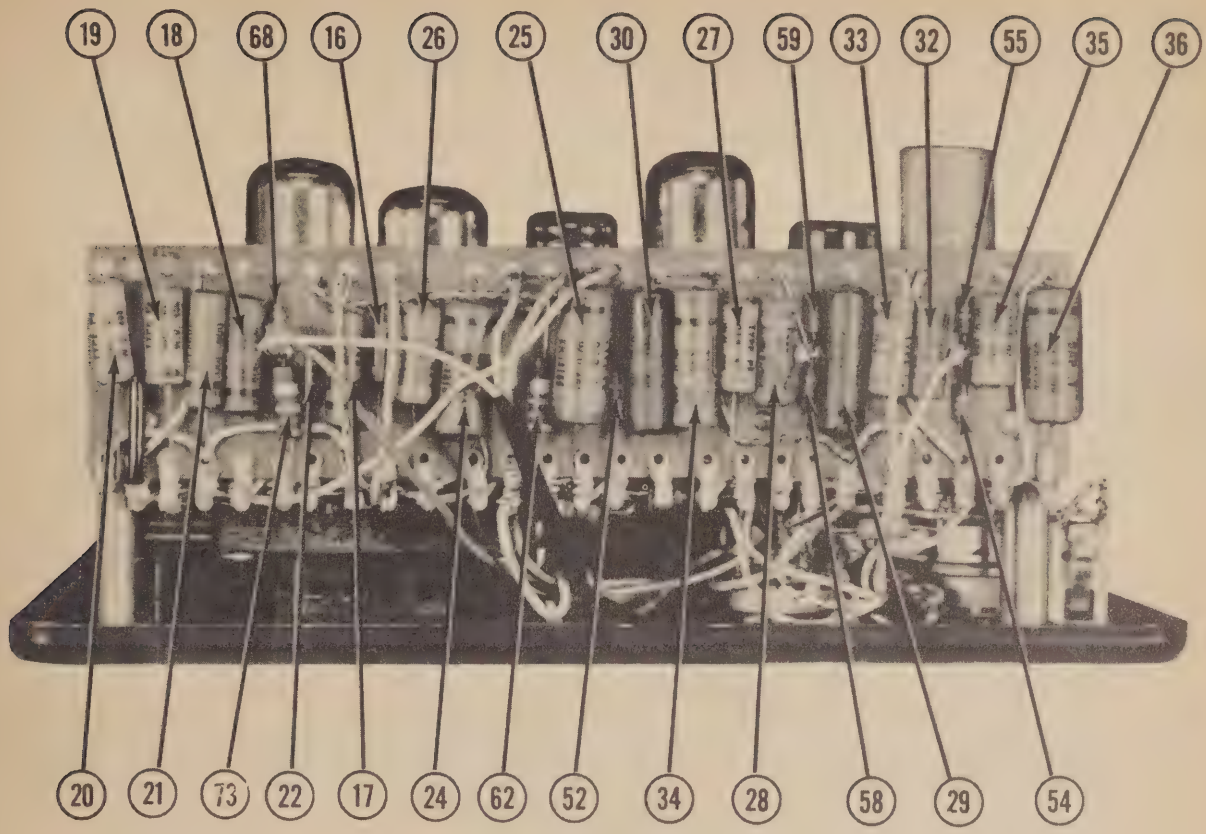

FIGURE 14—PANEL AMPLIFIER STRIP

Section L—See Motors

Section M—Power Supply

A type 5Y3 (9) rectifier tube is employed in a conventional full-wave rectifier circuit. In some units, the center tap of the 6-volt filament winding is returned to ground; in others, it is returned to a point having a positive voltage with respect to ground (voltage divider formed by resistors (75) and (76)). This latter circuit is used with certain types of power transformers to reduce hum. A 2-amp. fuse (92) is used in the Model BK-401, intended for 60-cycle use, while a 3-amp. fuse is employed in the 50-cycle version, Model BK-401-1.

Section N—Rectifier for Braking Circuit

A half-wave Selenium dry-disc rectifier is used to supply pulsating direct current for the dynamic braking operation. Some units have used the type 117Z6 rectifier tube for this purpose. When the 117Z6 is employed, the series resistor (84) value is changed from 100 to 50 ohms.

Sections P and Q—Head Assembly

1. The erase head (98A) and the record-reproduce head (98B) are mounted on the head bracket to form the head assembly. This assembly is furnished only as a unit and should either head fail, the entire assembly must be replaced. The heads are not repairable because of their construction.

2. If a new head assembly is to be installed, certain electrical changes may be necessary. The proper value for the play coil shunt capacitor (38) will be found marked on the new head assembly.

If the DC resistance of the erase head (98A) is 100 ohms, the proper value of the erase amplifier cathode resistor (74) is 680 ohms; while if its DC resistance is 70 ohms, the proper resistor value is 1800 ohms.

3. Removal and replacement of the head assembly will necessitate adjustment of the head brakes as outlined under "Head Brakes," page 4.

4. The surface of the heads upon which the tape rides and which contain the pole pieces are subject to an accumulation of tape coating residue, which is worn off as the tape passes. This must be periodically removed since it will cause distortion. The accumulation interferes with the proper passage of the tape and causes speed variation. It also prevents the tape from contacting the pole pieces.

5. This accumulation may be removed with car-

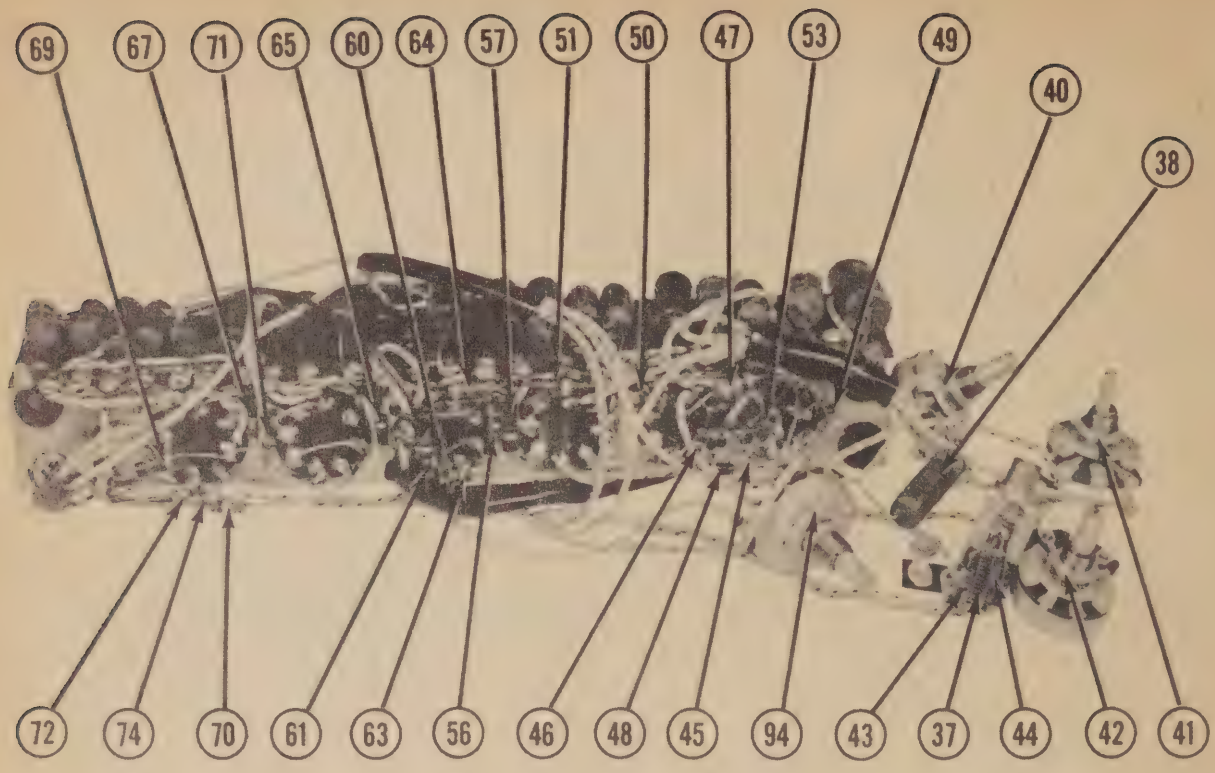

FIGURE 15—PANEL AMPLIFIER STRIP

bon tetrachloride and a small cotton swab on the end of a toothpick. Care should be taken to prevent damage to the panel from the solvent. It may be necessary to use the end of a good toothpick or cuticle stick to apply pressure as an aid in removing the coating. Be careful not to mar the exposed metal pole pieces.

Section R—See Pushbutton

Paragraph 16, Mechanical Operation and Adjustment.

Section S—See Limit Switches

Paragraphs 4-7, Mechanical Operation and Adjustment.

Section Y—Bias Amplifier

The 30 KC signal generated in Section G is here amplified in the second half of the 6SN7 (5) and fed to the plate circuit of Section E, where it mixes with the audio signal being recorded.

Section Z—Loudspeaker

A permanent magnet dynamic speaker (88) is used. Two voice coil impedances, 3.2 ohms and 8 ohms, are used; therefore, two types of output transformers will be found. The speaker cone (89) is not replaceable.

FREQUENCY RESPONSE

1. The frequency response specifications for the Brush BK401 SOUNDMIRROR are as follows:

100 cycles 0 to — 7 db
300 cycles ± 2 db
1000 cycles REFERENCE LEVEL
3000 cycles — 3 to + 5 db
5000 cycles — 12 to + 5 db

The difference in response between 3000 and 5000 cycles should not be greater than + 3 to — 10 db.

2. The frequency response may be checked as follows: Insert not more than one volt audio signal through microphone jack (138). Adjust record level control (41) to set the indicating eye (4) to within 1/16" of complete closure at 1000 cycles. Without change of record level control, make a recording of

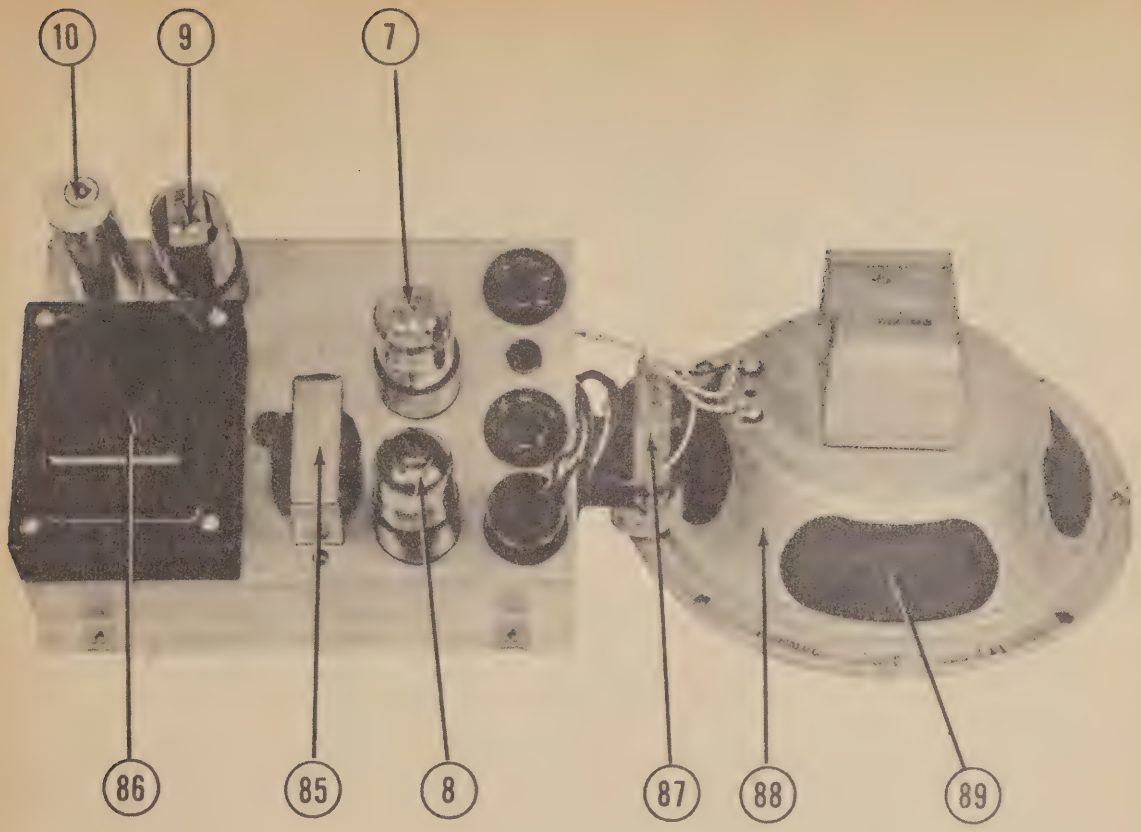

FIGURE 16—AMPLIFIER CHASSIS TOP VIEW

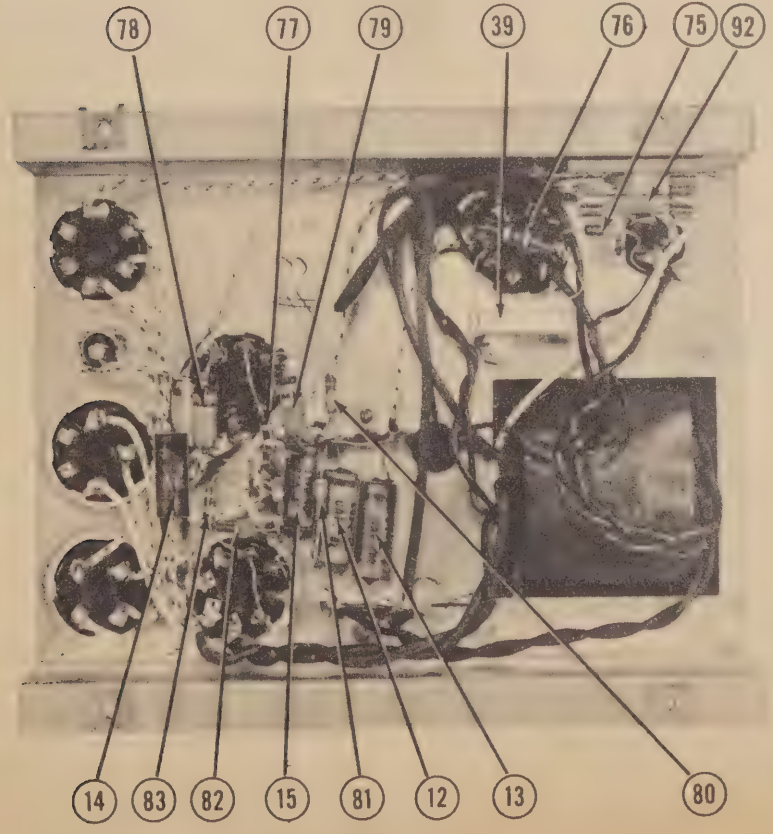

FIGURE 17—AMPLIFIER CHASSIS BOTTOM VIEW

FIGURE 18—AMPLIFIER CHASSIS POSITION

the following audio frequencies: 1000, 100, 300, 3000, and 5000 cycles. Connect output meter across voice coil. Adjust play volume control (40) so that meter reads approximately one volt at 1000 cycles. Use this as reference level and read output as listed in table above on db scale of meter.

3. The amplifier is equalized to provide more gain at the low frequencies and at the high frequencies, while the middle frequencies are attenuated. This is done to make the overall response of the recorder as flat as possible, since the response of the tape is down on the low and on the high frequencies. In Section B of the schematic, the cathode is bypassed with a small capacitor (29) to aid in high-frequency response. In this same section, the network formed by the resistor (53) and capacitor (32) is used in reproduction only to increase lows. It is shorted out during recording by a section of the record-play switch (94). The tone control (42) controls only the reproduction and monitoring responses and does not affect recording. The Section C, used only in recording, has a cathode bypass capacitor (30) to aid the high response. The network formed by resistor (58) and capacitor (28) boosts highs, while the network formed by resistor (59) and capacitor (34) boosts lows.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	50VDC†	2VDC	0V.	2VDC	55VDC	50VDC†	85VDC
2	6SN7GT	0V.	180VDC	5.2VDC	0V.	170VDC	4.9VDC	50VDC†	50VDC†
3	6SJ7	0V.	50VDC†	2.8VDC	0V.	2.8VDC	115VDC	50VDC†	145VDC
* 5	6SN7GT	30VDC	280VDC	72VDC	-10VDC	210VDC	0V.	50VDC†	50VDC†
* 6	6SN7GT	-19VDC	335VDC	28VDC	-10VDC	335VDC	28VDC	50VDC†	50VDC†
7	6SL7GT	0V.	300VDC	2.7VDC	0V.	300VDC	2.7VDC	50VDC†	50VDC†
8	6SN7GT	0V.	350VDC	12.5VDC	0V.	350VDC	12.5VDC	50VDC†	50VDC†
9	5Y3GT	0V.	350VDC	0V.	300VAC	50VDC	300VAC	0V.	350VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	70KΩ	1800Ω	500KΩ	1800Ω	1.1 Meg.	70KΩ	300KΩ
2	6SN7GT	500KΩ	90KΩ	1000Ω	500KΩ	90KΩ	1000Ω	70KΩ	70KΩ
3	6SJ7	0Ω	70KΩ	290Ω	1.1 Meg.	290Ω	26KΩ	70KΩ	110KΩ
* 5	6SN7GT	130KΩ	90KΩ	30KΩ	45KΩ	75KΩ	0Ω	70KΩ	70KΩ
* 6	6SN7GT	150KΩ	60KΩ	700Ω	100KΩ	60KΩ	700Ω	70KΩ	70KΩ
7	6SL7GT	1.1 Meg.	90KΩ	700Ω	22KΩ	90KΩ	700Ω	70KΩ	70KΩ
8	6SN7GT	400KΩ	60KΩ	680Ω	450KΩ	60KΩ	680Ω	70KΩ	70KΩ
9	5Y3GT	0Ω	60KΩ	INF.	95Ω	70KΩ	90Ω	INF.	60KΩ

*TAKEN IN RECORD POSITION. † 6.3VAC BETWEEN FILAMENT PINS.

SYMPTOM	CAUSE	REMEDY	TEXT REFERENCE
Insufficient or no erasing (Undesired background noise)	Defective Forward Limit Switch	Contact adjustment	Mech. Adj. Paragraph 5
	Overheating of resistor (74) reduces erase current	Reposition resistor away from takeup motor	Section "H." Figures 11 and 15
	Defective erase head	Replacement	Sections "P" and "Q"
	Defective tubes (5) or (6)	Replacement	Sections "G" and "H"
	Accumulation of tape coating residue, dirt, etc., on erase head	Cleaning of pole pieces of head	Sections "P" and "Q"
Distortion — Unintelligible, no bass	No recording bias	Check components in oscillator and oscillator amplifier	Introduction: Pars. 4 and 5. Sections "G" and "Y"
Muffled, low output	Accumulation of tape coating residue, dirt, etc., on Record-Reproduce head	Cleaning of pole pieces of head	Sections "P" and "Q"
Undue wavering of sustained note ("Wow" or "Flutter"). Apparent harmonic distortion or roughness	High freq. variation of tape speed (flutter):		
	Head pole piece accumulation	Clean pole pieces	Sections "P" and "Q"
	Dirty or glazed capstan	Clean capstan	Mech. Adj. Par. 12
	Defective drive assembly	Clean and adjust, or replace	Mech. Adj. Par. 11-15
	Chattering of Forward Limit Switch Actuator	Adjust actuator and Limit Switch	Mech. Adj. Par. 4-6
	Irregular torque of takeup motor	Replace motor	Motors, Par. 1, 7
	Low freq. variation of tape speed (Wow):		
	Slippage of tape on capstan	Clean capstan surface (144A)	Mech. Adj. Par. 12
	Binding of tape in any part of drive system	Check and adjust or replace the following:	
		Oversize tape	Introduction Par. 3
		Head brake shoes pressure excessive	Mech. Adj. Par. 8
		Warped reel	
		Supply brake pressure excessive	Mech. Adj. Par. 2, 3
	Binding of motor shafts	Realign motor bearings or replace motor	Motors Par. 2, 3, 5
	Binding of rotor against stator in any motor	Replace motor	Motors Par. 3
	Slippage or binding within drive assembly	Proper cleaning, lubrication and adjustment of drive assembly	Mech. Adj. Par. 11-15
	Warped reel dragging on panel	Straightening or replacing reel	
	Flat spot on idler wheel	Run for ½ hr. or more to relieve permanent set, or replace	Mech. Adj. Par. 14
Inoperative motor or motors	Faulty limit switch	Clean, adjust, or replace	"Limit Switches"—Mech. Adj. Par. 4-7
	Misplaced or lost contact in pushbutton switch	Replace contact or entire switch	Mech. Adj. Par. 16
	Dragging of rotor against stator or burned-out motor	Replace motor	Motors, Par. 3
Apparently weak takeup motor	Tape slipping on capstan	Clean dirt and glaze from capstan	Mech. Adj. Par. 12
	Rewind-brake shoe too tight	Adjust	Mech. Adj. Par. 2, 3
	Head-brake shoes too tight	Adjust	Mech. Adj. 8, 9
	Misaligned bearings on any motor	Adjust bearings	Motors, Par. 2

SYMPTOM	CAUSE	REMEDY	TEXT REFERENCE
Apparently weak rewind motor	Excessive friction in takeup motor		
	Misaligned bearings	Adjust	Motors, Par. 2, 5
	Brake friction on takeup motor (early units only)	Remove brake; not necessary or desirable	
	Reel dragging on panel	Straighten or replace warped reel	
	Misaligned bearing in rewind motor	Adjust	Motors, Par. 2, 5
	Supply brake shoe—too tight	Adjust	Mech. Adj. Par. 2, 3
	Accumulation of dirt and tape residue in Reverse Limit Switch	Clean Limit Switch Guide	Mech. Adj. Par. 6, 7
	Limit Switch Actuator pressure against tape too great	Adjust or replace Limit Switch	Mech. Adj. Par. 5, 6, 7
Drive motor apparently weak or inoperative	Misaligned bearing	Adjust	Motors, Par. 2, 5
	Tape slipping on capstan	Clean dirt and glaze from capstan	Mech. Adj. Par. 12
	Improper contact of idler against capstan or motor shaft	Be sure idler is free of grease	Mech. Adj. Par. 12
		Adjust idler tension spring	Mech. Adj. Par. 13
		Be sure idler bracket is free	Mech. Adj. Par. 13
	Excessive pressure on supply motor or head brakes	Adjust	Mech. Adj. Par. 2, 8
Takeup motor apparently runs excessively hot	Normal operation		Introduction, Par. 7 Motors, Par. 6
Tape stalls during operation	Excessive pressure on supply reel or head brakes	Adjust	Mech. Adj. Par. 2, 8
	Capstan dirty or glazed	Clean capstan	Mech. Adj. Par. 12
Failure of head brake shoe to retract under cover or return to braking position	Interference with wiring	Dress wiring away from moving parts	
	Binding at pivot	Adjust bracket for end play	Mech. Adj. Par. 10
	Interference with edge of panel	Reposition head assembly bracket	Mech. Adj. Par. 10
	Interference with head cover	Adjust shoe angle to clear and readjust pressure	Mech. Adj. Par. 10
Picks up radio station	Signal rectification by high-gain amplifier	Add bypass capacitors	Sect. "A"
Microphonics (when unit is jarred)	Microphonic tube	Replace tubes	Sections "A," "B"
	Microphonic head	Replace head	Sections "P," "Q"
Forward and reverse pushbuttons fail to remain depressed	Misadjustment of head-brake shoe	Adjust	Mech. Adj. Par. 8
Excessive accumulation of residue on Reverse Limit Switch	Misalignment of actuator	Realignment or replacement, and cleaning of actuator	Mech. Adj. Par. 6
	Roughness of cover	Removal of roughness	
Excessive hum	Magnetic field of motors	Adjustment of shield (168) on drive assembly	Motors, Par. 4
	Magnetic field of power transformer	Positioning of power supply chassis in cabinet—critical	Figure 18
	Takeup motor touching high-gain amplifier chassis	File corner of oil-retainer bar of motor	Motors, Par. 4
	Grounding of record head lead shield within head to form ground loop	Replace head	Sections "P," "Q"
	Screw holding bakelite panel to panel amplifier strip touches amplifier mounting assembly	Reposition washer on mounting assembly	
Incorrect constant speed of tape (correct speed is 7½" per second)	Incorrect friction braking pressures	Readjust	Mech. Adj. Par. 2, 3, 8, 9
	Improper constant speed of drive assembly	Replace entire drive assembly	Mech. Adj. Par. 11-15
Poor frequency response	Accumulation of dirt and tape residue on record head	Clean head pole pieces	Sections "P," "Q"
	Defective compensating component	Replace	Frequency response
	Insufficient bias in record head	Replace defective component	Sections "G," "Y"
	Magnetically defective record head	Replace head	Sections "P," "Q"
Spilling of tape during rewinding	Lack of dynamic brake on takeup motor when stop button is depressed:		
	Defective or misadjusted Limit Switch	Adjust or replace	Mech. Adj. Par. 4-7
	Defective Selenium Rectifier (117Z6 tube used in some units)	Replace	Section "N"
Tape refuses to enter or remain in guide of Reverse Limit Switch	Wrong Limit Switch cover	Replace	Mech. Adj. Par. 7
	Tape catches on burr	Remove burr	Mech. Adj. Par. 7
	Misadjustment of Limit Switch	Adjust or replace	Mech. Adj. Par. 4-7

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	105205	6SJ7 A.F. amplifier
2	103185	6SN7GT A.F. amplifier
3	105205	6SJ7 A.F. amplifier
4	105206	6E5 record level indicator
5	103185	6SN7GT oscillator and bias amplifier
6	103185	6SN7GT erase amplifier
7	103185	6SN7GT A.F. phase inverter—NOTE: Some models use 6SL7GT
8	103185	6SN7GT power output
9	102705	5Y3GT rectifier
10A, B	102711	Filter capacitor (electrolytic) 20-20 mfd. @ 450 volts
11A, B, C	103253	Filter capacitor (electrolytic) 20-20-20 mfd. @ 450/450/25 volts
12	103382	Line filter—.02 mfd. @ 400 volts
13	103382	Line filter—.02 mfd. @ 400 volts
14	103256	Audio coupling—.01 mfd. @ 600 volts
15	103256	Audio coupling—.01 mfd. @ 600 volts
16	CM20AE501M	Erase head 30 K.C. Tuning Capacitor—.0005 mfd. @ 600 volts
17	103383	Erase coupling—.001 mfd. @ 600 volts
18	103383	Erase coupling—.001 mfd. @ 600 volts
19	103256	Oscillator grid capacitor—.01 mfd. @ 600 volts
20	103256	Oscillator feedback—.01 mfd. @ 600 volts
21	103383	Tuning Capacitor—.001 mfd. @ 600 volts
22	CM20AE501M	30 K.C. coupling—.0005 mfd. @ 600 volts
23	CM20AE101M	30 K.C. coupling—.0001 mfd. @ 600 volts
24	103252	Audio coupling—.1 mfd. @ 400 volts
25	103252	Audio coupling—.1 mfd. @ 400 volts
26	103382	Screen bypass—.02 mfd. @ 400 volts
27	103256	Audio coupling—.01 mfd. @ 600 volts
28	103380	Treble boost—.0025 mfd. @ 400 volts
29	103254	Treble boost— .05 mfd. @ 400 volts
30	103254	Treble boost— .05 mfd. @ 400 volts
31	CM20AE101M	Treble attenuator—.0001 mfd. @ 600 volts
32	103255	Bass boost—.002 mfd. @ 600 volts
33	103382	Audio coupling—.02 mfd. @ 400 volts
34	103254	Bass boost—.05 mfd. @ 400 volts
35	103382	Audio coupling—.02 mfd. @ 400 volts
36	103252	Screen bypass—.1 mfd. @ 400 volts
37	CM20AE501M	Radio input bypass—.0005 mfd. @ 600 volts
38A	103380	Play coil shunt—.0025 mfd. @ 400 volts
B	103255	Play coil shunt—.002 mfd. @ 400 volts
C	103636	Play coil shunt—.004 mfd. @ 400 volts
		Correct value for play coil shun determined by marking on individual heads.
39	103256	Filament bypass—Not used in all Models .01 mfd. @ 600 volts
40	103469	Play volume control—1 megohm
41	103469	Record volume control—1 megohm
42	103469	Tone control—1 megohm
43	RC20AE474K	Series external A.F.—470K ohms ½ watt
44	RC20AE223K	External A.F. load—22K ohms ½ watt
45	RC20AE474K	1st A.F. Grid—470K ohms ½ watt
46	RC20AE182K	1st A.F. cathode—1800 ohms ½ watt
47	RC20AE224K	1st A.F. plate load—220K ohms ½ watt
48	RC20AE105K	1st A.F. screen dropping—1 megohm ½ watt
49	RC20AE223K	Decoupling—22K ohms ½ watt
50	RC20AE102K	Play A.F. amp. cathode—1000 ohms ½ watt
51	RC20AE273K	Play A.F. amp. plate load—27K ohms ½ watt
52	RC20AE222K	Voltage dropping—2200 ohms ½ watt
53	RC20AE105K	Tone compensation—1 megohm ½ watt
54	RC20AE683K	Tone compensation—68K ohms ½ watt
55	RC20AE224K	Tone compensation—220K ohms ½ watt
56	RC20AE102K	Second A.F. Cathode—1000 ohms ½ watt
57	RC20AE273K	Second A.F. plate load—27K ohms ½ watt
58	RC20AE333K	Tone compensation—33K ohms ½ watt
59	RC20AE822K	Tone compensation—8200 ohms ½ watt
60	RC20AE105K	A.F. grid—1 megohm ½ watt
61	RC20AE271K	A.F. cathode—270 ohms ½ watt
62	RC30AE473K	A.F. plate load—47K ohms 1 watt
63	RC20AE273K	Bleeder—27K ohms ½ watt
64	RC20AE333K	A.F. screen dropping—33K ohms ½ watt
65	RC20AE105K	Record tuning eye grid—1 megohm ½ watt
66	RC20AE105K	Record tuning eye plate load—1 megohm ½ watt
67	RC20AE104K	Oscillator grid—100K ohms ½ watt
68	RC20AE273K	Oscillator plate load—27K ohms ½ watt
69	RC20AE273K	Phasing resistor—27K ohms ½ watt
70	RC20AE104K	Erase amplifier grid—100K ohms ½ watt
71	RC20AE104K	Erase amplifier grid—100K ohms ½ watt
72	RC20AE473K	Bias amplifier grid—47K ohms ½ watt
73	RC30AE153K	Bias amplifier plate load—15K ohms 1 watt
74	RC30AE182K	Erase amp. cathode note 3—1800 ohms 1 watt
75	RC20AE474K	Voltage divider note 1—470K ohms ½ watt
76	RC20AE683K	Voltage divider note 1—68K ohms ½ watt
77	RC20AE681K	A.F. cathode—680 ohms ½ watt
78	RC30AE273K	A.F. plate load—27K ohms 1 watt
79	RC30AE273K	Phase inverter plate load—27K ohms 1 watt
80	RC20AE333K	Phase inverter grid note 4—33K ohms ½ watt
81	RC20AE474K	Output grid—470K ohms ½ watt
82	RC20AE474K	Output grid—470K ohms ½ watt
83	RC20AE681K	Output cathode—680 ohms ½ watt
84	103808-3	Voltage dropping note 2—100 ohms 10 watts

NOTE: 1—Not used in all models
2—Models using 117Z6 rectifier use 50 ohms—10 watts in this application
3—Some models use 680 ohms in this application
4—Models using 6SL7 use 22K ohms in this application

85	200925	Filter choke
86	200924	Power transformer
87A	200978	Output transformer for 8 ohms voice coil
B	200923	Output transformer for 3.2 ohms voice coil
88A	300450	Speaker (8 ohms voice coil)
B	300373	Speaker (3.2 ohms voice coil)
89	None	Cone not supplied separately
90	103293	Oscillator coil
91	103820	Selenium rectifier (117Z6 used in some models)
92	102625	Fuse AGC-2 (AGC-3 used in BK-401-1)
93	103258	On-off toggle switch
93A	103258	Switch nut (hex) accessory
93B	103258	Switch nut (knurled) accessory (Part of 93)
94	201364-4	Record-play switch
95	103144	Reverse limit switch
96	103144	Forward limit switch
97	200847	Pushbutton switch assembly
97A		Forward pushbutton

PARTS LIST (Cont.)

Ref. No.	Part No.	DESCRIPTION
97B		Reverse pushbutton
97C		Start pushbutton
97D		Stop pushbutton
97E		Record pushbutton
98	300496	Record-reproduce and erase head assembly
98A		Erase head cover
98B		Record-reproducer head cover
99	104820	Reel hold-down screw (used with 204927 motor)
100	104821	Reel hold-down clamp (used with 204927 motor)
101	BK-921	Reel empty (supply)
102	104154	Reverse limit switch cover
103	104202	Reel hold-down screw (used with 300345 motor)
104	103011	Reel hold-down cap
105	BK-921	Reel empty (take up)
106	103156	Actuator, reverse limit switch
107	104086	Reverse limit switch guide
108		10-32 x 5/16, R.H. Phillips capstan cover screw
109	ILW-10	Lock washer
110	103011	Capstan cover
111		8-32 x 5/16, R.H. Phillips motor mounting screw
112	ILW-10	Lock washer
113	103149	Forward limit switch cover
114	103156	Actuator, forward limit switch
115	300345	Take-up motor
116		8-32 x 5/16, R.H. Phillips motor mounting screw
117	ILW-8	Lock washer
118		8-32 x 3/8, R.H. Phillips screw (pre-amp. to panel)
119	300392	Panel
120		10-32 x 5/16, R.H. Phillips screw (drive assembly to panel)
121	103010	Spindle (capstan)
122		Screw, head assembly to panel
123		10-32 x 5/16, R.H. Phillips screw (drive assembly to panel)
124		6-32 x 1/4, R.H. Phillips screw (forward limit switch mounting)
125		8-32 x 3/8, "Z" R.H. machine screw (limit switch cover)
126	103564-501	Brake shoe (supply)
127	103568	Head shoe mounting rod
127A	W-6	End play washer
127B		Tinnerman nut
128	104822	Turntable (204297 motor only)
129	W-8	Thick spacing washer (used only with 204297 motor)
129A	103047	Thin spacing washer
130	204927	Rewind motor
131	ELW-6	Lock washer
132		Nut, 6-32 large hex
133	103567-501	Erase head brake shoe assembly (with pad)
134	103567-501	Record-reproduce head brake shoe assembly (with pad)
135	103880	Head brake shoe spring
136	104525	S-hook, head brake
137	103013	Turntable (300345 motor)
138	21421	Microphone jack
138A		Microphone jack hex nut
138B		Microphone jack insulating washer
138C		Microphone jack insulating washer
138D		Microphone jack lock washer
139	ILW-8	Lock washer
140	103584	Stud—amplifier suspension
141	200470	Bell crank assembly
142	ELW-6	Lock washer (bell crank mounting)
143		4-40 x 5/16, R.H. machine screw (bell crank mounting)
144	103213-501	Drive capstan
144A		Drive capstan corprene surface
145	103142	Clip, idler wheel
146	103067	Washer, idler adj. nut
147	103048	Idler wheel
148	ILW-10	Lock washer drive assembly mounting
149		8-32 x 1/2, R.H. Phillips screw, drive motor mounting
150	103582	Stud, drive assembly mounting
151	ILW-8	Lock washer
152	W-8	Washer
152A	W-8	Washer
153	200846	Drive assembly plate
154		8-32 x 1/2, R.H. Phillips screw, motor mounting
155	103250	Idler wheel bracket
155A	103148	Idler thrust washer
156	103153	Felt cushion
157	103032	Idler wheel tension spring
157A	L-71	Idler wheel tension spring lug
158		6-32 Elastic stop nut, Idler bracket adj. nut
159	ILW-10	Lock washer, plate mounting
160		8-32 x 5/16, R.H. Phillips screw, plate mounting
161		Drive spring (not used on some motors, not supplied separately)
162	103226	Spacer, motor mounting
163	103428	Motor mounting grommet
164	200988	Brake shoe cover (heads)
165		Lock washer, capstan spindle, 1/4" Cantlink
166		Nut, hex, 1/4 x 20
167	201404	Drive motor
168	104784	Hum shield, drive motor (used only with certain type motors)
169	400334-501	Cabinet assembly
170	200999	Speaker mounting board and grille
171	300376-501	Drive assembly, complete
172	201154	Microphone, Brush BA-102
173	103468	Control knob
174	103556	Pushbutton knob